RAILROAD GAZETTE

FRIDAY, MARCH 1, 1901.

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Contributions

A Run of a "Central-Atlantic" Engine—Correction.

We printed last week a letter containing the log of a round trip New York to Albany and return of one of the New York Central & Hudson River Railroad Company's "Central-Atlantic" engines. In the last line of the log was a serious error which we hope the reader detected as an obvious error. The arriving time at the Grand Central Station was reported as 10:20:00; it should have been 10:02:10.

Valve Motion of the "Croton."

Delaware, Ohio, Feb. 16, 1901.

TO THE EDITOR OF THE RAILROAD GAZETTE:

On page 108 of your issue of Feb. 15 the writer of the description of the locomotive "Croton" says "the main valve probably cut off at half stroke, and was worked by drop V-hook motion." My own experience and the most elementary treatises on valve motion show that a slide valve driven by eccentric (without link or other cut-off device) cannot be made by the lap alone to cut off practically at half stroke. F. C. SMITH.

[The author of the description of the "Croton" says "the sentence should read 'the main valve probably cut off at full stroke, and was worked by drop V-hook.' As I was writing the word 'half' was in my mind in connection with the expansion valve (as that was the usual rate of cut off), and I inadvertently placed it in the description of the main valve gear. Then, on coming to the description of the expansion gear I found that it was variable, so the word 'half' went from my mind, and I forgot to strike it out of the description of the main valve gear." In other words, the error was due to one of those unfortunate lapses of vigilance which come to all of us. The editor did not read either the manuscript or the proof with minute care, having perfect confidence in the knowledge and habitually thorough work of the author.—EDITOR.]

Working the New York Central Tunnel.

South Plainfield, N. J., Feb. 25, 1901.

TO THE EDITOR OF THE RAILROAD GAZETTE.

In your paragraph on the possible use of air motors between the Harlem River and the Grand Central Station in the *Gazette* of Feb. 22, you say, "Trains cannot change engines at or near the Harlem River; the traffic could not be handled if that time were lost."

Will this statement bear close analysis? First, as to inbound trains. It has been the practice for years for the locomotives to be cut loose, without stopping, from their trains as they approach the Grand Central Station and the trains run in on the arriving tracks under the control of the train crews. Is there any reason why this cannot be done as readily at some point near the Harlem River and the train brought to a stop close to the awaiting air motor? How much longer would this take than for the train to be brought to a stop by the road locomotive? Against a possible additional delay of, say thirty seconds, you have saved first, the complication of the work of the Grand Central yard by the introduction of a new element in the air motor, as the air motor has only been substituted for the road locomotive; second, the mileage of the road locomotive to the Grand Central station and back light to the roundhouse north of the Harlem River.

With outbound trains, the same method could be followed, namely cutting off the air motor without stopping, sidetrack it and bring the train to a stop close to the awaiting road locomotive. This delay would be longer than if the road locomotive had been hauled "dead" from the Grand Central Station, but as the air-brakes and the air signal would be tested before leaving the station by the air motor, one minute would probably cover.

As this whole matter is only an effort to improve the atmosphere of the tunnel approach to the Grand Central Station, is not the system used at the terminal station at Boston applicable, at least in a modified form? If two locomotives, each hauling five cars, produce more smoke and gas in the tunnel approach than one locomotive hauling ten cars, it would be an advantage to have the one train of ten cars pass through the tunnel approach rather than the two trains of five cars each. The time table on the Old Colony Division of the N. Y., N. H. & H. R. R. provides for trains out of the Boston terminal of two, three or four parts, which parts are successively left as junction points are reached, and are then taken up by the awaiting branch locomotive. Inbound this method is reversed so that on arriving at the Boston terminal station one locomotive has attached two, three or four parts from as many different branch points on the division. This is not a system of dropping and picking up cars for the entire branch trains run through solid—except as to the locomotive—with conductors and brakemen.

Following out this method, Harlem Division locals and Hudson Division locals would be hauled by one locomotive south of the Harlem River, in both directions.

L. E. MOLINEUX.

Locomotives at the Paris Exposition.

At the February meeting of the Western Railway Club there was a discussion of the locomotive exhibit at the Paris Exposition, and below we print extracts from the remarks of Mr. S. M. Vauclain and Mr. George Gibbs, both of the Baldwin Locomotive Works.

Mr. Vauclain—The Baldwin Locomotive Works was the only locomotive firm of the United States that was able to exhibit locomotives at Paris. We exhibited three locomotives, and we had quite a time doing it. It is not a very easy matter to show a locomotive at a foreign exposition. First it is difficult to get the space. We could only obtain space for two locomotives, but through the agitation in France over the exhibition of a Baldwin locomotive by the Government Railroads, we were unable to obtain space for three locomotives. In other words, the Government Railroads captured one of the locomotives that we were going to exhibit, and as it was the most presentable locomotive that they had, they placed it at the head of their own exhibition, and in view of the capturing of that locomotive, they allowed us to send another one of a consignment of locomotives that had been landed in France, assemble it hastily and place it in the Exposition, so that we could fill our place.

I would not undertake to detract from the excellent finish placed upon locomotives by European manufacturers, especially those built in Switzerland. But it must be remembered that all their locomotives were built expressly for exhibition, and all the locomotives exhibited by the Baldwin Locomotive Works were simply those that through persuasion we were able to sidetrack from regular shipments that we were making to foreign countries.

The first that we arranged for was the locomotive for the Great Northern Railway (England); the second was one that was built for the Government of France, a locomotive for fast runs. This locomotive, as I said before, was taken by the Government itself, and created quite a riot in the Chamber of Deputies. The third locomotive was an Atlantic type that was built long after that, and barely arrived in time to hustle it into the Exposition, and get it into place. We were very much indebted to the French people for their kindness, and for the assistance that they gave us in fixing up the paint work, which was scarred and scratched during transshipment, and the hasty unpacking of the cases, and the damage done to the cases through careless handling.

The outcome of the exhibits was all that we could expect. We had intended to exhibit more than twice the number of locomotives that we did. On behalf of the locomotive builders of the United States I think I may say, that if it were not for the enormous expense that attaches to the exhibition of each locomotive, and the immense amount of trouble required to follow the matter up and to obtain a locomotive that thoroughly represents our practice, more of the builders would participate in foreign exhibits. The Richmond Locomotive Works undertook to exhibit, but by the time they were able to secure permission from the railroad for whom the locomotive had been built, and get it shipped there, it was too late to get even on the outside of the exposition; consequently it was not exhibited or even unpacked.

The Baldwin Locomotive Works, however, took a mean advantage. They played what was termed a dirty Yankee trick on all the locomotive exhibitors at the Paris Exposition. We had the foresight to set up our locomotives and to supply compressed air to them and operate them just as though they were being operated on the rail. The consequence was, we had all the people with us, the visitors were there, and I doubt if any one who visited the transportation department at Paris came away without seeing the Baldwin locomotives and seeing them in action.

It must not be considered so important that a locomotive have this excellent watch finish. Every foreign railroad for which we now furnish locomotives is specifying more and more that we obliterate all finish and paint the parts. They are getting to recognize the fact that as locomotives are constructed and operated in America, their maintenance per engine mile is very much decreased when they operate similar locomotives in their own country. I do not think the American locomotive builder has any apology to make. We were not ashamed of the engines that were at Paris. They were not finished so handsomely as the foreign engines were, but they were not designed expressly for exhibition purposes.

Mr. George Gibbs—Perhaps I can add one or two points, as I spent several days in Vincennes, in and about the locomotive exhibit. I think it was by far the most interesting transportation exhibit ever held. The locomotive exhibit I also considered very fine, the finest collection of locomotives ever put together from different sources, and the remarkable thing about it is that the Europeans should have caught on to American ideas of locomotive practice so rapidly in the last ten years. Nearly all the prominent European countries are building large locomotives now, and they are copying the dimensions of our locomotives, copying our proportions, copying our types. The latest American type, the Atlantic type of passenger engine, has gone over there and is now the standard type for the heaviest French passenger service. It is also found in Germany and Austria.

Probably the finest locomotive in the exposition was of the Northern Railroad of France. It is an Atlantic type engine that would be considered a heavy, large engine in this country. It is built to haul a heavy through train from Paris to Calais, 185 miles, in three hours, and the train is a heavy one. It carries 213 lbs. of steam, has 2,275 sq. ft. of heating surface, 30 sq. ft. of grate surface, 80 in. drivers, 74,000 lbs. on the drivers, and 140,000 lbs. total weight. It has underhung springs and equalized spring rigging throughout. With the exception of plate frames it has a great many American features, and it is a fine, trim locomotive throughout. This engine is a four-cylinder compound, with the high-pressure cylinders outside and coupled to the back drivers, and the low-pressure cylinders inside and coupled to the forward crank axle. This type of four-cylinder compound engine is the standard type to-day in France for passenger service. There are about 800 running now, and it is said to be an economic machine in every way. It certainly is a smart machine. It pulled a heavy train out of the station without a moment's hesitation, which I consider a creditable feat.

One speaker has remarked about the incentive for the use of compound engines as being on account of the high price of coal, which is undoubtedly true. But the compounding there is, on the other hand, of the engines which burn relatively a small amount of coal, that is, on the small engines. If it is an important matter to save a certain percentage of high-priced coal, it is certainly of the same advantage to save a large amount of low-priced coal. The compound engine, I believe, may be considered the standard locomotive, both in freight and passenger service in Europe. In England this is not so. There is only one road that uses compounds, and that is the London & North Western. Mr. Webb, of that road, has experimented with various types, having started with two-cylinder, then taking up the three-cylinder, and now it has four-cylinder compounds. His four-cylinder engine was the finest in the English exhibit, certainly the finest finished there. It had some remarkably beautiful workmanship carried out to all parts, even the rod straps being finished. And in some cases it was left black, just as it came from the crucible, so you could see which was hardened and which was not. England, in my opinion, did not make a creditable exhibition, as a whole. There was one engine that was built in 1900 for exhibition purposes.

The next engine, which I think was the most admirable engine in the Exposition, was the Von Borries compound. That is, a four-cylinder compound, with the high-pressure cylinders inside and the low-pressure outside, in this case. It has a single valve motion, that is a set of eccentrics which run two piston valves for the high-pressure cylinders, and slide valves for the low-pressure cylinders, making a simple arrangement for connection with the axle.

The Walschaert valve motion was another very striking feature, in fact, it is almost a standard motion on the Continent with four-cylinder engines. That has the advantage, of course, of having only one eccentric, or one crank for each side. It does not require one for the reverse and one for the forward movement. Those valve motions are usually arranged, one for high and one for low-pressure and with two screw reverses. They find it an advantage to alter the cut-off in accordance with the position of the reverse lever.

The largest exhibition of locomotives there was the German. They had numerous large engines, and some of them of very peculiar type. They were nearly all

compounds, and the cylinders were placed in almost every conceivable position. They also had a number of mountain climbing engines of the total adhesion class, and with a flexible wheel base, and these various systems of trucks were connected together by a peculiar flexible rod connection. It was the most marvelous system to look at that I had ever seen, and I should think we could not have many on our roads; we could not keep them up. There was one firm particularly that seemed to run to that style of engine, and I accounted for those peculiar types from the fact that a very large number of the builders of locomotives exhibiting there were also builders of stationary engines; they turn out one or the other, as it happens, and the stationary engine man has got his work in on the locomotives with very peculiar results.

Locomotives for the Colorado Springs & Cripple Creek District Railroad.

The Schenectady Locomotive Works recently built for the Colorado Springs & Cripple Creek District Railroad some consolidation freight locomotives, and also some six-coupled double-end switching locomotives having two two-wheeled engine trucks with swinging bolsters, one truck at front and one at back. The chief points of interest are given in the following list for each class of locomotive:

Consolidation.

Weight working order	168,000 lbs.
Weight on drivers	151,000 lbs.
Cylinders.	
Diameter of cylinders	22 in.
Stroke of piston	26 in.
Size of steam ports	18 in. x 1¼ in.
Size of exhaust ports	18 in. x 2¾ in.
Size of bridges	1⅛ in.
Valves.	
Slide valves	Richardson balanced
Greatest travel of slide valves	5½ in.
Outside lap of slide valves	¾ in.
Inside lap of slide valves	0 in.
Lead of valves in full gear	0 in.
Kind of valve stem packing	U. S. Metallic
Wheels, etc.	
Diameter of driving wheels outside of tire	51 in.
Material of driving wheel centers	Cast steel
Driving box material	Cast steel
Diam. and length of driving journals	9 in. diam. x 10 in.
Diam. and length of main crank pin journals (main side, 7¼ in. x 5 in.)	6½ in. diam. x 6½ in.
Diam. and length of side rod crank pin journals (inter., 5½ in. x 4¾ in.)	F. & B., 5 in. diam. x 3⅝ in.
Engine truck wheels	Standard cast steel spoke cen., 3 in. tire held by Mansell ret. rings
Boiler.	
Boiler	Straight
Outside diam. of first ring	74⅜ in.
Working pressure	180 lbs.
Heating surface, tubes	2,542.95 sq. ft.
Heating surface, fire-box	195.6 sq. ft.
Heating surface, total	2,738.55 sq. ft.

Switching.

Weight working order	133,000 lbs.
Weight on drivers	106,000 lbs.
Cylinders.	
Diameter of cylinders	19 in.
Stroke of piston	24 in.
Size of steam ports	18 in. x 1¼ in.
Size of exhaust ports	18 in. x 2¾ in.
Size of bridges	1⅛ in.
Valves.	
Slide valves	Richardson balanced
Greatest travel of slide valves	5½ in.
Outside lap of slide valves	¾ in.
Inside lap of slide valves	0 in.
Lead of valves in full gear	0 in.
Kind of valve stem packing	U. S. Metallic
Wheels, etc.	
Diameter of driving wheels outside of tire	51 in.
Material of driving wheel centers	Steeled cast iron
Driving box material	Steeled cast iron
Diam. and length of driving journals	8½ in. diam. x 9 in.
Diam. and length of main crank pin journals (main side, 6½ in. x 5¼ in.)	5½ in. diam. x 6 in.
Diam. and length of main crank pin journals,	5 in. diam x 3⅝ in.
Engine truck wheels	Standard cast steel, spoke center, with 3 in. tire held by Mansell ret. rings
Boiler.	
Boiler	Straight
Outside diam. of first ring	66¼ in.
Working pressure	180 lbs.
Heating surface, tubes	1,600.47 sq. ft.
Heating surface, fire-box	148.47 sq. ft.
Heating surface, total	1,748.94 sq. ft.

Both engines have Westinghouse-American combined brakes on drivers, tender and for train, and Le Chatelier water brake on cylinders.

The Commerce of the Great Lakes.

We received, a few days ago, the annual statistical report of the commerce passing through the canals at Sault Ste. Marie. This is compiled under the direction of Lieut.-Col. G. J. Lydecker, Corps of Engineers, U. S. A., by Mr. Joseph Ripley, Assistant Engineer and General Superintendent.

The traffic for 1900 exceeds that of any previous year, but the percentage of increase was the smallest for 10 years. Compared with 1899 there were nearly 32 million bushels less of wheat and other grain and one-third of a million tons less of anthracite coal. The increased tonnage was principally in iron ore, which gained considerably over one million tons and reached the aggregate of 16,444,000 tons. The total grain other than wheat carried was a little over 16 million bushels and the wheat carried was 40,489,000 bushels. The coal aggregated 4,487,000 net tons, about half a million of this being anthracite. The total freight traffic through the two canals was 25,643,000 net tons, of which the American canal passed 92 per cent. and the Canadian canal 8 per cent. Of passengers, however, the American canal passed but 62 per cent. and the total for both canals was 58,555. The season of navigation was 7 months and 28 days.

The freight rates increased on iron ore from 70 cents to $1.05 and on manufactured iron from $1.70 to $2. On pig iron it remained the same, at $1.50. The rate on coal fell from 46 cents to 44. The cost of transportation per ton-mile was 1.18 mills in 1900, as compared with 1.05 in 1899 and .79 in 1898, the lowest rate recorded. These freight rates are compiled from published quotations and from information obtained from shippers and owners and include loading and unloading.

The greatest single cargo was 8,462 tons, carried by the steamer "John W. Gates," of the American Steamship Company. The next cargo was 8,206 tons, carried by the barge "Madeira," of the Minnesota Steamship Company. The greatest number of miles run was by the steamer "Troy," of the New York Central & Hudson River Railroad Company, namely, 45,318 miles, and the greatest ton-mile record was by the "John W. Gates," 154,554. Vessels spent necessarily in the canal an average of 1 hour and 10 minutes, the aggregate being 19,366 hours and 33 minutes. Other delays, which included taking on supplies and waiting for daylight or favorable weather, amounted to 16,298 hours and 31 minutes. The report gives many interesting and useful statistics, those which we have selected being but a very small part of the whole.

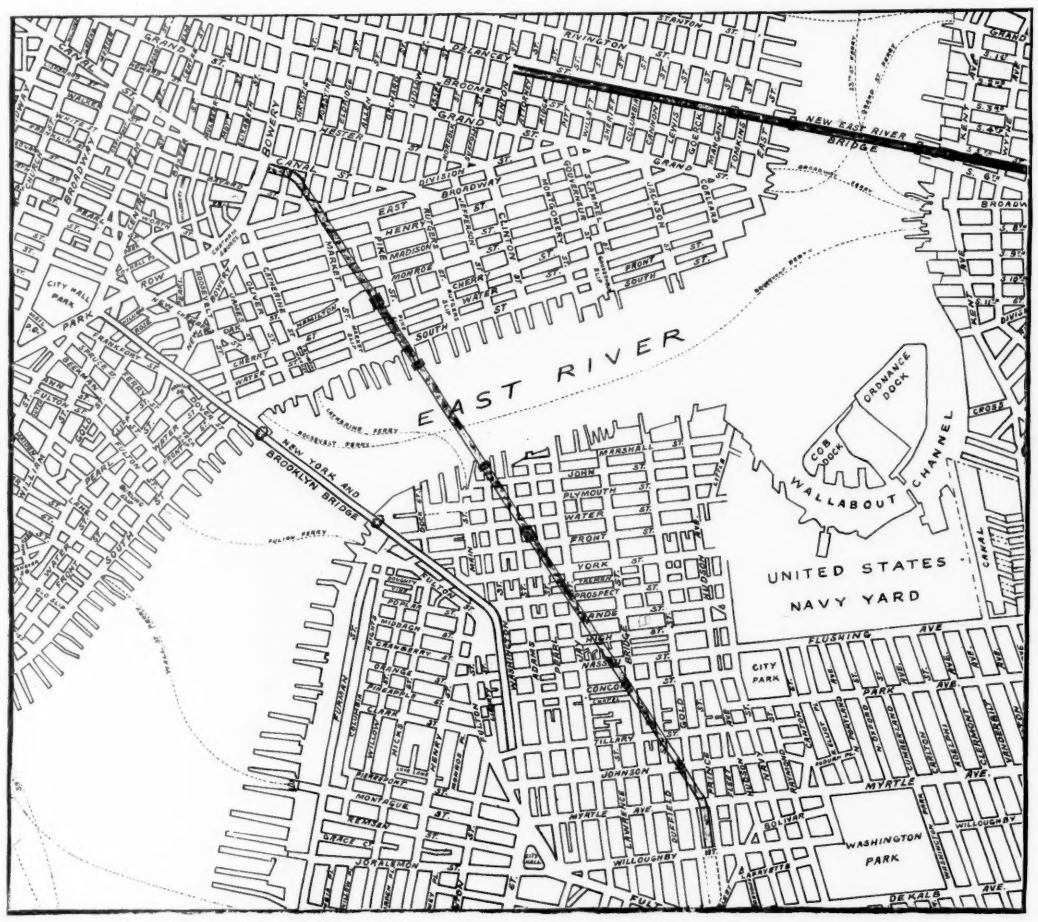
Below is certain general information which *Bradstreet's* has compiled from recent official figures:

The commerce of the great lakes in the navigation season 1900 has exceeded that of any preceding year. According to the figures secured by the Bureau of Statistics there were received by vessels at the 37 principal ports on the great lakes between April 1, 1900, and the close of the year a total of 1,266,234 tons of flour, 52,834,256 bushels of wheat, 70,805,801 bushels of corn, 33,290,767 bushels of oats, 11,526,501 bushels of barley and 1,840,892 bushels of rye. These figures do not include the shipments to or from ports on the Canadian side of the canals or through the Welland Canal. The great bulk of the grain traffic originated at Chicago and Duluth, and had Buffalo as its point of destination. The receipts of iron ore by water at the ports embraced in the bureau's compilation reached a total of 16,268,027 tons, and this may be accepted as about 85 per cent. of the entire movement of iron ore both by rail and water. All the principal ore-receiving and shipping ports are covered by the bureau statement. Of the 16,268,027 tons handled, 15,843,681 tons are shown to have been shipped from the six ports of Two Harbors, Duluth, Escanaba, Ashland, Marquette and West Superior, and 13,623,609 tons were received at the six ports of Ashtabula, Cleveland, Conneaut, South Chicago, Buffalo and Erie. Many different classes of commodities, such as provisions, dry goods and hardware, are reported under the general head of unclassified freight. This movement at the principal lake ports during the past year reached the aggregate of 3,471,131 tons. Buffalo, 668,831 tons; Cleveland, 275,673 tons; Detroit, 234,482 tons, and Milwaukee, 325,124 tons. Lumber shipments were made during the season from 32 of the 37 ports, the commerce of which the Bureau of Statistics kept a record, receipts being recorded at an equal number of ports. The total receipts aggregated 2,122,403,000 ft.

East River Bridge No. 3.

It is a pleasure to see that the project for a third bridge across the East River between New York and Brooklyn has advanced to the stage of asking for bids. Those who are at all familiar with the geography and the traffic conditions of the situation are aware that there is likely to be movement enough across the river to keep the three bridges busy by the time the New East River Bridge and Bridge No. 3 are completed.

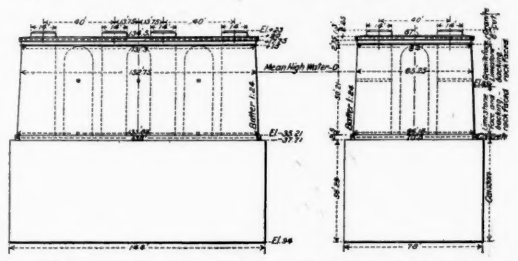
The general elevation of Bridge No. 3 is shown in the engraving herewith. It is to be a structure 9,335 ft. long between terminals, consisting of the main suspended span 1,465 ft., center to center of towers, two flanking suspended spans 850 ft. each, the Manhattan approach 1,940 ft. and the Brooklyn approach 4,230 ft. The approaches are trussed girders on steel towers. The minimum height of the bridge above mean high water is 135 ft.; the total width is 120 ft. The bridge carries a central carriageway 38 ft. between the inner pair of cables On each side of this, between the inner and outer cables (and, of course, between the stiffening trusses), is a pair of trolley tracks on the same level as the roadway; that is, four trolley tracks on the bridge, two on each side. Outside the trolley tracks are the footways. The carriageway is 38 ft. wide, the width between the stiffening trusses where the trolley tracks are placed is 21½ ft., and the width of each footwalk is 11 ft. Above the trolley tracks and between the stiffening trusses are two elevated railroad tracks; that is, one on each side of the bridge.



Map Showing the Relative Position of Three East River Bridges. Scale: 1 in. = 2,000 ft.

Bridge No. 3 is between the Existing New York & Brooklyn Bridge and the New East River Bridge, now building.

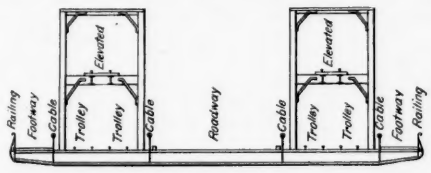
The position of this bridge relatively to the existing New York and Brooklyn Bridge and the New East River Bridge is shown on the map herewith. It will be seen that it lies between them and somewhat nearer the old bridge than to the New East River Bridge, and that it runs from Canal street in a direction south by east. The top of the map is not exactly north. The great object of the bridge is to relieve the pressure on the New York & Brooklyn Bridge, and it will be seen that its Brooklyn terminus taps much the same territory. With the numerous tracks and the ample roadway and footway which it will carry it will be able to handle a great traffic, more in fact than could be handled by three double-track tunnels inasmuch as a roadway for teams and footways would not be practicable in tunnels. The New York end is on a broad street and in an important center of business and population.



Brooklyn Tower Foundation—East River Bridge No. 3.

The grade of the long Brooklyn approach (which is

entirely over a private property) is 1.5 per cent. The grades on the bridge and on the Manhattan approach are 3 per cent. The Brooklyn end of the approach is between Myrtle avenue and Willoughby street and between Prince and Gold streets. The New York terminus is between Canal street and Bayard street and between the Bowery



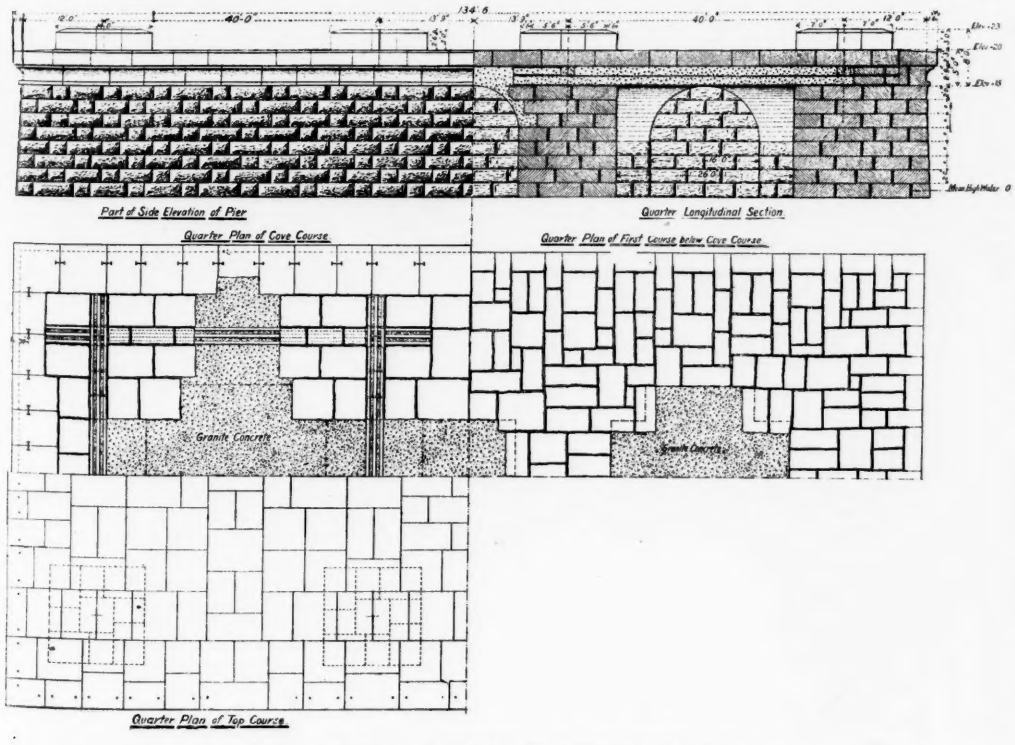
Cross-Section East River Bridge No. 3.

and Forsythe street. As the New York terminus is now laid out there will be two trolley loops and consequently the trolley cars will not cross the roadway.

The bids now called for are for the foundation of the Brooklyn tower and these will be opened March 11. The caisson is to be 78 ft. x 144 ft. in plan and 56.29 ft. high, and its top will be 37.71 ft. below mean high water; that is, it will be sunk to a depth of 94 ft. and landed on rock. The total height of the foundation and masonry pier above the cutting edge of the caisson is 117 ft. The caisson itself is 56.29 ft., the concrete on the top of the caisson 2.5 ft., the masonry of the pier proper 55.21 ft. and the pedestals 3 ft. The height above mean high water is 23 ft. So far as we can judge from the drawings and specifications there is no striking novelty in the caisson, but it is, as a matter of course, an example of thoroughly good sound design. A timber coffer dam is to be built on the caisson to take the masonry and drawings and specifications for this, as well as for the caisson are provided, but the bidder may submit his own plans. It is specified that bidders for this work must be known to be experienced in pneumatic foundation work and to have been engaged in similar work. Designs of the plan for sinking the caisson and handling the material must be approved by the engineer and all plant must be such as to insure safe and rapid progress. The masonry is to be a single pier of limestone, granite and granite concrete. The cove course is to contain an I-beam grillage intended to prevent the action of temperature changes and the inclination of the tower legs from developing cracks in the masonry. This grillage is to be encased in granite concrete.

The contractor must begin work within 10 days after receiving notice from the commissioner and must complete the work, ready to receive the towers, within 320 calendar days, and must give bonds to the amount of $200,000. The bids will be a lump sum for the work complete. The datum plane, to which it is assumed the cutting edge of the caisson will penetrate, and on which penetration the bid must be based, is at 94 ft. below mean high water. The contractor will be paid, in addition to the lump sum bid, an amount named in his bid for each cubic yard of rock excavated. For the purpose of comparing bids, the quantity of rock above the datum plane is estimated at 600 cu. yds. If the contractor is required to excavate below the datum plane, he shall be paid for such work per cubic yard of completed work, and the prices bid may be different between horizontal planes 2 ft. apart. The contractor will receive, in addition to the amount bid per cubic yard of completed work below the datum plane, an additional amount bid for each cubic yard of rock excavated. For the purpose of comparing bids, it is estimated that there will be below the datum plane the following quantities of completed work:

94 to 96 ft. below M. H. W., 500 cu. yds., including 100 cu. yds. of rock.
96 to 98 ft. below M. H. W., 250 cu. yds., including 50 cu. yds. of rock.
98 to 100 ft. below M. H. W., 125 cu. yds., including 25 cu. yds. of rock.
100 to 102 ft. below M. H. W., 60 cu. yds., including 12 cu. yds. of rock.
102 to 104 ft. below M. H. W., 30 cu. yds., including 5 cu. yds. of rock.


Part of Side Elevation of Pier
Quarter Longitudinal Section
Quarter Plan of Cove Course
Quarter Plan of First Course below Cove Course
Granite Concrete
Quarter Plan of Top Course

Masonry of Tower Foundation East River Bridge No. 3.

East River Bridge No. 3—New York and Brooklyn.

S. L. PROBASCO, *Chief Engineer, Dept. of Bridges.* JOHN L. SHEA, *Commissioner of Bridges.* R. S. BUCK, *Chief Engineer in Charge.*

Some Details—Car Oiling, Bolts, Nuts and Keys.

At the last meeting of the Western Railway Club Mr. G. W. Rhodes gave an interesting talk on bolts, nuts and keys and presented certain facts which, while in themselves important, are possibly most valuable as suggesting other details which need attention. To illustrate his point, that much can be accomplished by attending to the little things, he spoke first about the experience of the Burlington in the matter of oiling passenger and freight cars. It seems that in 1885 freight car oiling on the Chicago, Burlington & Quincy cost on an average 13 cents per thousand miles and this was a representative figure for the next few years. The Galena Oil Company took hold in 1891 and by 1894, as the result of its vigorous work, this figure was reduced to 7½ cents per thousand miles. Since then, and after Mr. Rhodes went to the Burlington Lines West, this has been brought down to the neighborhood of 3 cents. This further reduction started an investigation on the Burlington & Missouri River, and it was found that the records of that road showed that in passenger service in 1895 the oil per thousand miles cost 22 cents; in 1896, 17 cents; in 1897, 17 cents; 1898, 12 cents, and in 1899, 11 cents. The corresponding figures for freight cars were: 1895, 15 cents; 1896, 14 cents; 1897, 13 cents; 1898, 12 cents; in 1899, 12 cents, or one cent more than the passenger oiling. During the past year this subject has been given special attention.

The passenger car record for 1900 started at the first of the year at 9 cents and had gone to 11 cents when the special study commenced. There was an almost immediate decline in the cost of this item, which reached 4 cents, 3 cents and 5 cents during the summer months. In December it was found that the summer oil was running into the winter oil and it was determined to change all the oil and waste in passenger service that month and re-sponge with winter oil; which accounts for the increase in December, the cost being 9.13 cents for that month. However, this time the summer oil and waste has been stored in barrels at different points and will be used again next season.

In freight service in 1900 the oil record showed 5 cents in March, about 2½ cents in May and continued under 3 cents until October. During the winter months it rose to 6 cents, bringing the average for the year to 4.4 cents per thousand miles, where the previous year it was 12.3. This difference of 8 cents on the Burlington & Missouri River represents a money saving of nearly $10,000 a year, but the greatest saving is brought about by the reduction in train delays on account of fewer hot boxes. The difference in the conditions in this respect is said to be simply a revelation to the officers who brought about the change. As Mr. Rhodes said, "we accomplished these results by giving attention to our equipment in place of giving oil, as we used to do."

He then proceeded to show sketches of locomotive brake rigging, an engine truck pedestal jaw, column bolts of a diamond frame truck and an eccentric strap. These were drawings of actual cases which had caused failures. In each the point was clearly brought out that the cotter pin was so far from the nuts that it had allowed the nuts to work loose, giving from ⅜ to ½ in. play of the bolts and in the end the threads were stripped or the bolts broken. The conclusion is that many unaccountable accidents can be attributed to faulty details of this kind. These little things are now being followed up in much the same way that car oiling was handled.

The improvement in car oiling was brought about directly through the efforts of a specialist appointed to look after that work and who gave his entire time to it. And it is Mr. Rhodes' opinion that through the employment of these specialists the railroads can get these details followed up intelligently; details that the master mechanic or foreman cannot find time for.

Two-Cylinder Compound Consolidation Locomotives, Class G-1—New York Central Railroad.

In describing the new Class 1 engines of the New York Central Railroad, in the *Railroad Gazette* of Feb. 1, it was said that the Schenectady Locomotive Works were also building 20 two-cylinder compound consolidation freight locomotives with wide fire-boxes for this railroad. The order thus referred to has been increased to 55 of those engines that are now being built for delivery during the year. One of these engines, No. 2,342, has been finished, and is now at work. It was recently tested pulling a train of 80 loaded freight cars, the gross weight of which was 3,225 tons, and the run from DeWitt to West Albany was made in 13 hours and 35 minutes when the temperature ranged from 10 to 12 degrees above zero. The engines are classified as G-1, and the engine that was tested is here shown from a photograph. Nearly all of these engines will probably go on the Mohawk Division. They are equipped with steam heating and air signaling apparatus, so that they may be used in emergency on passenger trains. The engines are designed for freight service entirely, but they have wheels large enough to allow them to be used for passenger service as here mentioned.

It may be noted from the illustration that there are two relief valves on the side of the low-pressure cylinder. These are gravity valves that seat upwardly, and are thus closed when steam enters from the throttle, and fall to open position and take the place of a by-pass valve when the engine is drifting with throttle shut. The cylinders are designed to be about equivalent to those of a 21½ x 34-in. simple engine and the working steam pressure is 210 lbs. The high-pressure cylinder has a piston valve and the low-pressure cylinder an Allen-Richardson balance valve. The diameters of the cylinders are 23 in. and 35 in. and the stroke 32 in. The total weight in working order is 190,000 lbs., 164,000 lbs. of which is on the drivers. The driving wheels are 63 in. diameter over tires.

The boiler is straight with wide fire-box, the outside diameter of the first ring being 70 in. The crown stays are radial, 1⅛ in. diameter and other staybolts are 1 in. diameter. The ratio of grate area to heating surface is about as 1 to 64. The fire-box length is 96 in.; width, 75 in.; depth, front, 71 in., and depth, back, 61 in. A brick arch supported on water tubes is used, and the grate area is 50.31 sq. ft., to supply a total heating surface of 3,217.13 sq. ft., 148.05 sq. ft. of the heating surface being in the fire-box. These and other particulars may be found in the following table:

Schenectady Compound Consolidation Locomotive—N. Y. C. & H. R. R. R.

Fuel	Bituminous coal
Weight in working order	190,000 lbs.
Weight on drivers	164,000 lbs.
Wheel base, driving	17 ft. 0 in.
Wheel base, rigid	17 ft. 0 in.
Wheel base, total	25 ft. 9 in.

Cylinders.

Diam. of cylinders	H. P. 23 in., L. P. 35 in.
Stroke of piston	32 in.
Horizontal thickness of piston	H. P. 4⅝ in. and 5¾ in. L. P. 4⅜ in. and 5¾ in.
Diam. of piston rod	4 in.
Kind of piston packing	Cast iron rings
Kind of piston rod packing	U. S. Metallic
Size of steam ports	L. P. 23 in. x 2⅝ in.
Size of exhaust ports	L. P. 23 in. x 3 in.
Size of bridges	L. P. 1⅜ in.

Valves.

Kind of slide valves	H. P. piston type, L. P. Allen-Richardson balanced
Greatest travel of slide valves	6 in.
Outside lap of slide valves	H. P. 1¼ in., L. P. 1 in.
Inside clearance of slide valves	H. P. ⅛ in., L. P. ¼ in.
Lead of valves in full gear	1/32 in. blind
Kind of valve stem packing	U. S. Metallic

Wheels, etc.

Diam. of driving wheels outside of tire	63 in.
Material of driving wheel centers	Cast steel
Tire held by	Shrinkage
Driving box material	Cast steel
Diam. and length of driving journals	9 in. diam. x 12 in.
Diam. and length of main crank pin journals	
Main side 7½ in. x 5¼ in.	6½ in. diam. x 6 in.
Diam. and length of side rod crank pin journals	
Inter. 5½ in. x 4¾ in.	F. & B. 5 in. diam. x 3¼ in.
Engine truck, kind	Two-wheel, swing bolster
Engine truck journals	6¼ in. diam. x 10 in.
Diam. of engine truck wheels	33 in.
Kind of engine truck wheels	New York Car Wheel Works spec. double plate chilled

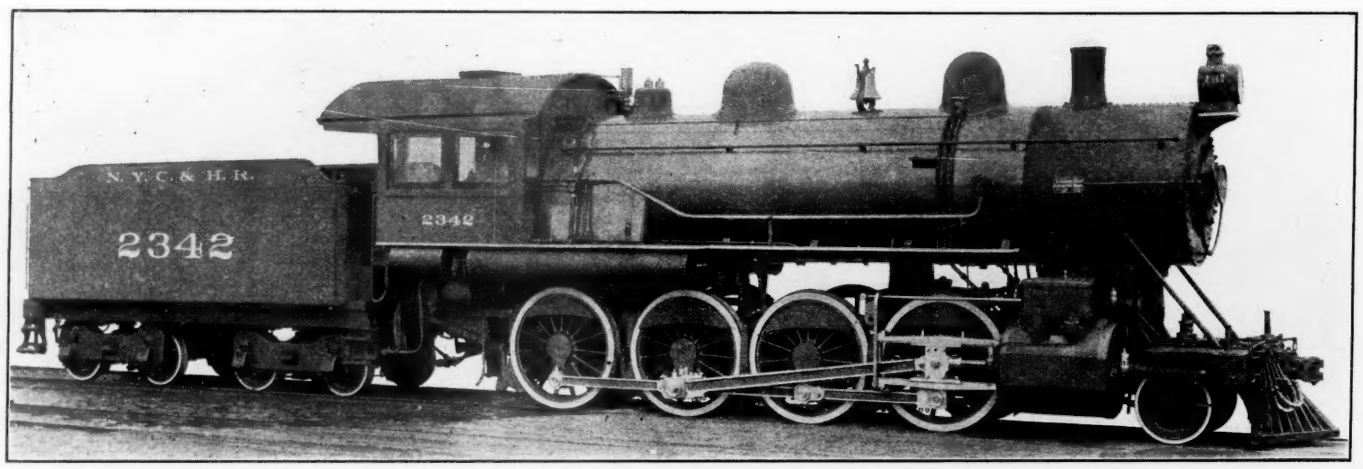
Boiler.

Style	Straight, with wide fire-box
Outside diam. of first ring	70 in.
Working pressure	210 lbs.
Material of barrel and outside of fire-box	Carbon steel
Thickness of plates in barrel and outside of fire-box	¾ in., ½ in., ⅝ in. and 13/16 in.
Horizontal seams	Butt joint, sextuple riveted, with welt strips inside and outside
Circumferential seams	Double riveted
Fire-box, length	96 in.
Fire-box, width	75 in.
Fire-box, depth	71 in. F., 61 in. B.
Fire-box, material	Carbon fire-box steel
Fire-box plates, thickness	sides 5/16 in., back ⅜ in., crown ⅜ in., tube sheet ½ in.
Fire-box, water space	Front, 4 in. and 5 in.; sides, 3½ in. and 5½ in.; back, 3½ in. and 4½ in.
Fire-box, crown staying	Radial stays, 1⅛ in. diam.
Fire-box, stay bolts	1 in. diam.
Tubes, material	Charcoal iron, No. 12 B. W. G.
Tubes, number of	365
Tubes, diam.	2 in.
Tubes, length over tube sheets	192 in.
Fire brick, supported on	Water tubes
Heating surface, tubes	3,040.81 sq. ft.
Heating surface, water tubes	28.27 sq. ft.
Heating surface, fire-box	148.05 sq. ft.
Heating surface, total	3,217.13 sq. ft.
Grate	50.31 sq. ft.
Grate, style	Rocking N. Y. C. St'd
Ash pan, style	Hopper
Exhaust pipes	Single
Exhaust nozzles	5¼ in., 5½ in., 5¾ in. diam.
Smoke stack, inside diam.	15½ in. and 14 in.
Smoke stack, top above rail	14 ft. 9 in.
Boiler supplied by	Two Nathan "Monitor" injectors, size No. 10

Tender.

Weight, empty	46,800 lbs.
Wheels, number of	8
Wheels, diam.	33 in.
Journals, diam. and length	5 in. diam. x 9 in.
Wheel base	16 ft. 6½ in.
Tender frame	10 in. steel channels
Tender trucks	Fox pressed steel, bolster type
Water capacity	5,000 U. S. gallons
Coal capacity	10 tons
Total wheel base of engine and tender	53 ft. 9 in.

The engines are equipped with Westinghouse-American combined brakes on drivers, tender and for train; Westinghouse engineer's air signal; Lappin brake-shoes on driving and tender wheels; Consolidated steam heating apparatus, with McLaughlin flexible joints, etc.; Mason reducing valve; three 2½ in. Consolidated muffled safety valves; National hollow brake-beams on tender; Franklin sectional lagging on boiler and cylinders; Gould coupler at front of engine and rear of tender; Leach sand feeding apparatus, and a water scoop on tender.



Schenectady Compound Consolidation Freight Locomotive—Class G-1, New York Central Railroad.

Elevation of the New Haven Tracks in Bridgeport.

A part of the extensive improvements planned by the New York, New Haven & Hartford in the city of Bridgeport, Conn., has been so far completed that trains began running over the new elevated line for about 1⅗ miles last Sunday. The portion of the work now completed is that involving the least amount of difficult work, being simply an embankment, with retaining walls, and bridges over the openings for the streets; but the change abolishes 12 of the 25 grade crossings in Bridgeport and includes the widening of the road, from two-track to four-track, for more than one-third of the distance between the four-track sections east and west of the city.

The new road begins about two miles west of the station and extends eastward. It consists of an embankment 66 ft. wide with retaining walls both sides, the railroad being on the line of a street practically the whole of the distance. During construction the trains have been run over two temporary tracks laid in the street at the north side of the railroad right of way. The new roadbed is the company's standard; stone ballast, 100-lb. rails and four-bolt joints.

The grade of the streets is left practically unchanged. The work for the distance mentioned (1⅗ miles) required 170,000 yards of earth, 8,000 yards of masonry for abutments of bridges and 57,000 yards of third-class masonry for the retaining walls at the sides. The length of coping, 16 in. wide, is 14,500 ft. About 1,600 yds. of concrete was used. The contractors for the earthwork and stone work were Messrs. Bryan & Sheehan, of New York. The bridges are all plate girders, and the openings are all 50 ft., except one, which is 80 ft., making the total length of bridging (four-track) 630 ft. Six of the bridges were built by the American Bridge Company and six by the King Bridge Company. In all of these bridges the main girders rest on bents of steel columns on the curbstone line, making most of the spans about 30 ft. long. The track girders are continuous from abutment to abutment.

The gravel for this work was brought from a pit eight miles out of Bridgeport on the Naugatuck Division, and the granite for the masonry came from Roxbury, Conn., 35 miles from Bridgeport, on the Litchfield Branch of the Danbury Division. The whole work has cost about $700,000.

No work has yet been done on the remainder of the proposed Bridgeport improvement, so that there is still a section of the main line about two miles long which has but two tracks. The work yet to be done will be very costly as there will be a four-track lift bridge, and a large number of foundations which must be built in the mud bottom of the river and harbor. The present line runs for a long distance on a timber trestle standing partly in the water; this will be replaced by a steel structure resting on masonry piers.

General Baggage Agents.

The annual meeting of the American Association of General Baggage Agents, held at St. Augustine, Jan. 17, was briefly reported in the *Railroad Gazette* of Jan. 25. The official report of the proceedings, now at hand, gives some facts not then mentioned. The rules of the Association concerning the transportation of corpses have been adopted as law by the states of Virginia and South Carolina; and the committee in charge of the matter is making progress toward a similar result in other states. The committee appointed to find out whether express rates are less than baggage rates, to the detriment of the baggage department, reported that except between some of the larger cities, where there is a long haul, express rates are not more advantageous to salesmen with large quantities of baggage than are the express baggage rates. In the West and Southwest express rates are in many cases higher than baggage rates. In a discussion on a question sent by the Michigan Passenger Association it appeared that theatrical companies sometimes send their baggage by railroad and then send the passengers by an electric line. One or two passengers, with tickets, go by the railroad and accompany the baggage, while all the rest of the members of the company go by some other conveyance. To those who wished to know whether this trick of the theatrical managers could be circumvented it was said that each passenger presenting extra baggage should be made to prove his individual ownership of the baggage.

The use of string card checks instead of card checks in brass holders was advocated by one member, but a committee of five, after considering the question, reported it as their opinion that the string check had not been proved sufficiently safe for use on baggage.

On the afternoon of the second day the Association listened to a witty address by Mr. G. T. Spilman, of the Chicago Great Western.

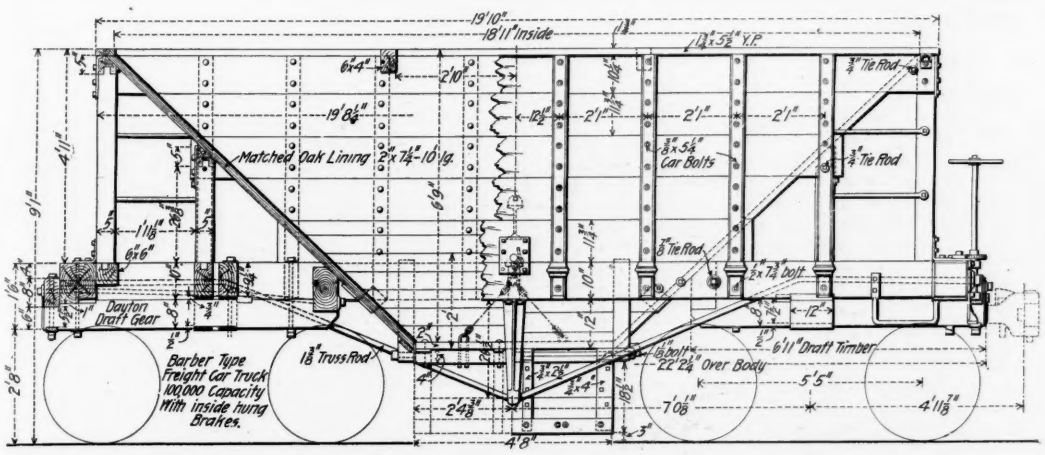
At a convention of those engaged in mining and metallurgy in Russia held recently, one of the delegates assumed to give an account of the "speed" with which freight is forwarded on the Russian railroads, in which he said that, including halts at stations, the most rapid freight movement was less than four miles an hour—but this is only for long hauls. The regulations prescribe a speed while running of 10 to 12 miles per hour. For hauls of 200 to 400 versts (133 to 266 miles), the speed attained is from 1½ to 2 miles an hour; for shorter distances little more than ½ mile. A good walker can leave a freight train far behind him. If claims for damages for delay are made they are rarely allowed, and the courts look on them with disfavor. It is not at all probable that this delegate or any one else has the data which would enable him to know the average time freight is on the road in Russia, but he may have reported the experience of some one shipper.

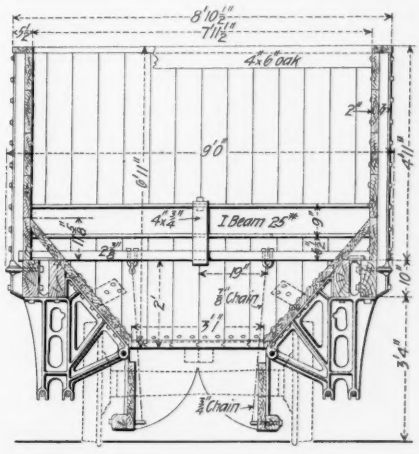
The United States Consul at Nottingham, England, reports that the coal mine proprietors of South Yorkshire are selling coal to the railroad companies at $3.28 a ton, which is 73 cents less than the price heretofore. The contracts now being made cover a supply for six months. The price is still nearly a dollar higher than it was before the recent phenomenal rise.

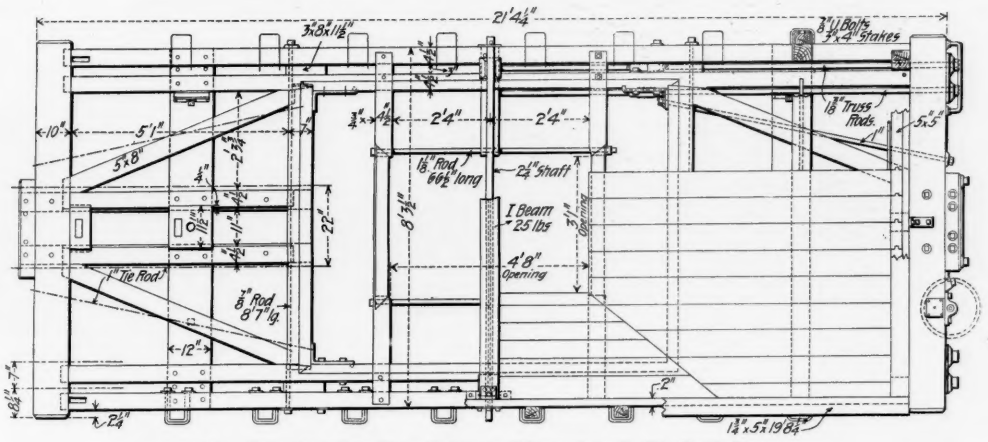
New 100,000-lb. Capacity Wooden Ore Cars—Chicago, Milwaukee & St. Paul Ry.

The Chicago, Milwaukee & St. Paul has been running 250 wooden ore cars of 100,000 lbs. capacity since the middle of last summer, and these have given such good service that this design will be continued. These cars were built in the West Milwaukee shops and some idea of their strength and stiffness is got from the fact that there is practically no deflection of the sills under a load of 112,000 lbs. As said, the rated capacity is 100,000 lbs., and the capacity of the hopper level full is 568 cu. ft. The actual light weight of the car is 29,300 lbs., or about the same as recent all-steel ore cars. This makes 51.6 lbs. of dead weight per cu. ft. of carrying capacity to the top of the sides. The ore hauled varies in weight from 140 to 300 lbs. per cu. ft.

The first of these cars had a timber header extending lengthwise through the hopper at the center, but in the later cars this is left out as it seems to be unnecessary and is in the way of discharging the load. The construction of the latest ore cars with some small improvements over the first design are clearly shown by the engravings.



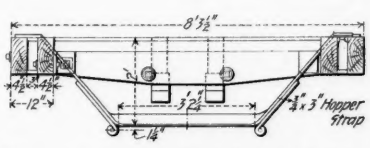




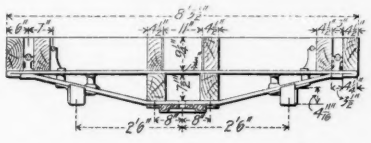
100,000 lbs. Capacity Ore Car—Chicago, Milwaukee & St. Paul Ry.

The first of these cars had a timber header extending lengthwise through the hopper at the center, but in the later cars this is left out as it seems to be unnecessary and is in the way of discharging the load. The construction of the latest ore cars with some small improvements over the first design are clearly shown by the engravings.

The length inside at the top is 18 ft. 11 in. and the width is 7 ft. 11½ in., while the over all dimensions are 22 ft. 2¼ in. and 9 ft. respectively. The top of the sides is 9 ft. 1 in. above the rail and the hopper is 6 ft. 11 in. deep. The long sills and the siding are yellow pine and the rest of the timber used is white oak. There are two side sills, 4½ x 10 in., placed 3 in. apart, and two 1⅜ in. truss rods are used on each side of the center. These rods engage a deep malleable iron post at the middle of the car which also forms a support for the hopper sides.



Transverse Section Near Center of Car.



Transverse Section Near Body Bolster.

100,000 lbs. Capacity Ore Car—C., M. & St. P. Ry.

Stub sills, 4½ x 10 in., are used at the center. These are framed into a heavy oak cross beam, 7 x 12 in., connecting the side sills at the rear of the bolster. This end framing is reinforced by diagonal oak braces, 5 x 8 in., by heavy tie rods and corner irons. The ends of the hopper are carried on crossbeams which, in turn, are supported by posts framed into the sills, the sides being held by outside oak stakes. The sides are tied together at the top by cross timbers and rods. The winding shaft by which the doors are worked is protected by a piece of I-beam. It will be seen that by this construction the sides of the hopper are unbroken and slope to a clear opening at the center which is 4 ft. 8 in. long and 3 ft. 1 in. wide. The doors when hanging open clear the rail by about 3 in. Dayton double spring draft rigging is used. The body bolsters are trusses with top and bottom plates ¾ in. thick and 12 in. wide. Barber diamond frame trucks are used with inside hung brakes.

From rather meager comparisons with other short cars designed for ore traffic, it would seem that these cars probably have as large a carrying capacity in proportion to the dead weight as any ore cars so far built, not excepting metal cars. The great weight of these loaded cars and the short wheel base give very high loading for track and bridges, being a little less than 6,400 lbs. per lineal ft.

Engineering Education.

In the volume of the Transactions of the Society for the Promotion of Engineering Education, recently published, is a paper by Prof. W. G. Raymond, discussing in general the work of the Society. He has considerable doubt as to whether the Society has or can fulfil the expectations of those who founded it, and who have carried it along so far. His concluding remarks follow: Now what have we done about it all? We have accumulated a considerable amount of information about entrance requirements to scientific courses in American colleges; we have read and printed some 172 papers and reports, covering some 2,000 printed pages. These papers have treated for the most part the minor details of teaching work, have been of considerable interest and some of them very valuable in suggestion. We have assembled seven times, with an average attendance, perhaps, of some 50 people, and have talked and exchanged opinions and become acquainted; and we have spent for it all, including railroad fares and hotel bills, probably something like $12,000; $6.00 a page for our printed papers, with our pleasant intercourse thrown in. Has it paid? Almost every one of us is, or ought to be, a member of some of the great scientific societies, the scope of any one of which is ample to cover the detail of our work; and almost all of us read, or should read, two or three or more technical journals whose columns are always open to anything of sufficient interest to their readers to warrant publication. Have we not been dissipating our energies at the expense of the greater societies? Is there not a tendency to spread ourselves out too thin? Have we not lost sight of the great aim of all education in the consideration of less important details? Have we not worked with a smaller and less definite purpose than we should? Is not this a reasonably fair statement of what we have done about it?

What can we do about it? I suggest that we can appoint a committee to confer with prominent teachers and successful engineers as to what an engineering degree should mean, and what that degree should be; that the committee then formulate a report, taking one or two years as may be necessary; that we again come together to receive and discuss the report and make some general recommendations; and that we should then adjourn sine die with the understanding that when in later years a similar convocation seems to be warranted it may be held. Is not this about all we can accomplish that is really worth the effort we are now making?

It may well be said that any who are not satisfied with the results of our work may quietly withdraw without publishing their grievances as has been done in this paper. To this I may reply that I had this very thing in mind, until I learned that there is a strong feeling of this kind on the part of others, which, if allowed to grow, means a gradual dying out of the society. It occurred to me that it is better to find out just how strong this feeling is, to discuss fairly the future of the society, and to provide for a more active continuance, or a dignified death, rather than to permit a gradual death by slow torture.

And this brings me to my last topic, which I shall leave wholly to you for discussion. What are we going to do about it? Shall we have a definite purpose for the future? Or are we doing now the best we can, and is that best worth what it costs?

The Steel Combination.

The new United States Steel Corporation this week filed articles of incorporation in New Jersey. At the office of J. P. Morgan & Co. it was stated that they were not yet prepared to make any official statement or issue any circular giving the full details of the Corporation. They recognize, however, that it is due to the public and the various stockholders that they should know as early as possible the basis upon which securities of the various companies will ultimately be received for conversion into the securities of the new corporation, which is as follows:

The following offer is to be made for stock of the several companies named:

	New pfd.	New com.
Federal Steel pfd	1.10	...
Federal Steel com	.04	1.07½
Am. Steel & Wire pfd	1.17½	...
Am. Steel & Wire com	...	1.02½
National Tube pfd	1.25	...
National Tube com	0.88	1.25
National Steel pfd	1.25	...
National Steel com	...	1.25
Am. Tin Plate pfd	1.25	...
Am. Tin Plate com	.20	1.25
Am. Steel Hoop pfd	1.00	...
Am. Steel Hoop com	...	1.00
Am. Sheet Steel pfd	1.00	...
Am. Sheet Steel com	...	1.00

As to the stocks of the last four companies, the aggregate amount of stocks so to be offered was arranged with the principal stockholders of those companies who have requested the distribution of such amount among the four companies to be made in the percentages as stated.

The following analysis appears in the *Wall Street Journal*, presumably by Mr. Woodlock:

The issuance of official figures of exchange of steel securities enables a general compilation respecting capital, as in the table following, which shows the amount of new capital to be issued for each of the constituent companies:

	Amount of old stock.	Ratio of exch'g.	Amount of new.
Federal Steel pfd	$53,260,900	110	$58,586,990 pfd.
Federal Steel com	46,484,300	107½	49,990,062 com.
Federal Steel com	.....	4	.....
Am. S. & W. pfd	40,000,000	117½	47,000,000 pfd.
Am. S. & W. com	50,000,000	102½	51,250,000 com.
Nat. Tube pfd	40,000,000	125	50,000,000 pfd.
Nat. Tube com	40,000,000	125	50,000,000 com.
Nat. Tube com	.....	8.8	3,520,000 pfd.
Nat. Steel pfd	27,000,000	125	33,750,000 pfd.
Nat. Steel com	32,000,000	125	40,000,000 com.
Am. T. Plate pfd	18,325,000	125	22,906,250 pfd.
Am. T. Plate com	28,000,000	125	35,000,000 com.
Am. T. Plate com	.....	20	5,600,000 pfd.
Am. St. Hoop pfd	14,000,000	100	14,000,000 pfd.
Am. St. Hoop com	19,000,000	100	19,000,000 com.
Am. Sh. St. pfd	24,500,000	100	24,500,000 pfd.
Am. Sh. St. com	24,500,000	100	24,500,000 com.
	$457,070,200		$531,462,674

It appears, therefore, that the following increases have been made:

	Old stock.	New stock.	Increase.
Preferred	$217,085,900	$261,722,612	$44,636,712
Common	239,984,300	269,740,062	29,755,762
Total	$457,070,200	$531,462,674	$74,392,474

We give a comparison of the present common and preferred stocks of the steel companies with the new stock, which they get and the increases. It shows a total in-

crease of over $75,000,000 of capital, of which 23½ millions is in National Tube:

	Old stock.	New stock.	Increase.
Federal Steel	$99,745,200	$110,436,424	$10,691,224
Am. S. W.....	90,000,000	98,250,000	8,250,000
Nat. Tube	80,000,000	103,520,000	23,520,000
Nat. Steel	59,000,000	73,750,000	14,750,000
Tin Plate	46,325,000	63,506,200	17,181,250
Am. Hoop	33,000,000	33,000,000	.....
Am. Sheet Steel....	49,000,000	49,000,000	.....
Total.....	$457,070,200	$531,462,674	$74,392,474

The New Plant of the Franklin Air Compressor Co.

The new plant of the Franklin Air Compressor Company, at Franklin, Pa., was formally opened on Tuesday of last week, invitations having been accepted by many engineers and other guests. During the morning the plant was inspected and at noon a lunch was served in the counting room. Gen. Charles Miller, in a short speech, outlined the purposes of the company and its work. In the afternoon the guests visited the new plants of the General Manifold Company and the Grant Machine Tool Company, both of which are nearing completion. General Miller will direct the operations of these plants, the first-named plant being built and installed under the direction of Mr. John A. Hill as Mechanical Engineer.

The air compressor company was recently organized. Gen. Charles Miller, President of the Galena Oil Co., is President; Mr. J. S. Coffin, Assistant to the President; Mr. J. W. Duntley, President of the Chicago Pneumatic Tool Company and the New York Air Compressor Company, is Vice-President; Mr. S. G. Allen, General Manager; and Mr. E. A. Cowles, Superintendent. The output of the Franklin Air Compressor Co. will be marketed by the New York Air Compressor Company, of which Mr. J. W. Duntley is President; Alexander Mackay, Vice-President; and W. P. Pressinger, Secretary and General Manager, with offices at 95 Liberty street, New York. The Franklin shops are now at work on an order for some 40 air compressors and have been in operation about two weeks, although the formal opening was deferred until last Tuesday. It is intended to build compressors suitable for every purpose to which compressed air is put.

The work of building began about Aug. 1 and no time has been lost in developing the plant which, because of the ground upon which it is located, involved some difficulties of construction. In the accompanying illustrations the general layout of the plant, a plan and elevation of the piping in the boiler and engine rooms, and a plan and sections of the power transmission arrangement are shown. The plant occupies about 3½ acres between the Erie tracks and French Creek with a frontage of 522 ft. on the creek. The location is but a short distance above the junction of French Creek with the Allegheny River. It was necessary to build a wall along the creek front and this is 14 ft. high with a base of 4 ft., a top width of 22 in., giving 2 ft. 6 in. above the high water in the creek. The wall is of dimension stone and contains about 1,000 cu. yds. of masonry laid in Empire Portland cement.

The General Manager's office is brick, of two stories, the first floor being used for an office and a reception room. On the second floor are the accounting department and the office of the Mechanical Engineer. There is built as a northwest wing of the machine shop a two-story brick building, on the first floor of which is the Superintendent's office and a well-equipped locker and washroom. On the second floor are the draughting room, 30 ft. x 50 ft., and a separate room, 30 ft. x 50 ft., that will be used for a lunch room and reading and assembly room for employees. Particular care has been given to sewerage and sanitation. The machine shop is a frame building 102 x 250 ft., sheathed on the outside with galvanized corrugated steel and roofed with Cary fireproof roofing. The woodwork of the shop walls is double-boarded lap, 1¾ in. thick in the outside course and has an 8-in. air space between that and the inside face of the walls which is of ⅞-in. matched siding 10 in. wide, making the total wall thickness 10⅝ in. A cross-section of this building is shown in Fig. 3. The floors of the machine shop, pattern shop, boiler room and pattern storage house are of Portland cement concrete 4 in. thick laid on rammed cinders and faced with neat cement. It may be seen from the cross-section that for the erecting floor there is a clear central width of 60 ft., the whole length of the machine shop, and that under the bay roof at either side there is a width of 20 ft. This width of 20 ft. is given up entirely on the one side to machine tools, except for the testing floor, and on the other the space is divided, as shown in the plan view for machine tools and testing floor, and a tool room and small supply room which are not plotted on the plan. The tool room is well arranged and machine tools are well distributed. The testing floor has 14 pairs of 15-in. I-beams at each side of the car track, laid near enough together to form a slot at the floor level, which will receive the anchor bolts for the temporary location and testing of compressors. As shown by lines in the plan view, this floor is laid in half its width with loose iron cover plates which rest on removable 8-in. I-beams, and when it is desired to locate and test a compressor the cover plates are taken off and the 8-in. I-beams are removed. The compressor is bolted down to the slots formed by the 15-in. I-beams and the fly-wheel of the compressor is received in the pit, which is ordinarily covered by the cast-iron cover plates.

The height from the shop floor to the base of the clearstory, which is at the level on which a large traveling crane runs, is 27 ft., and the height of the clear story is 12 ft. The total floor space of the machine shop is 25,000 sq. ft. Windows are liberally provided and the light effect is good. The interior of the shop is painted with white Lythite cold water paint; all machine tools are white enameled, and, the concrete floor being comparatively light in color, the result is an exceptionally well-lighted shop. There are now installed 70 modern machine tools. About 4,000 ft. of belting is now being used.

A switch track from the Franklin branch of the Erie railroad enters the west end of the shop and runs to the end of the testing floor, as shown in the shop plan, and brings all incoming or outgoing materials within the field of the traveling crane. The crane commands the total central field of the shop and has, therefore, a clear bridge span of 60 ft. It is operated by compressed air at 80 lbs. pressure, has a lifting capacity of 20 tons, a transverse speed of the carriage of 150 ft. per minute and a bridge speed of 100 ft. per minute. It was made by the Chisholm & Moore Mfg. Co., of Cleveland, Ohio, who will also make a 25-ton pneumatic traveling crane of the same bridge span for the foundry of this plant.

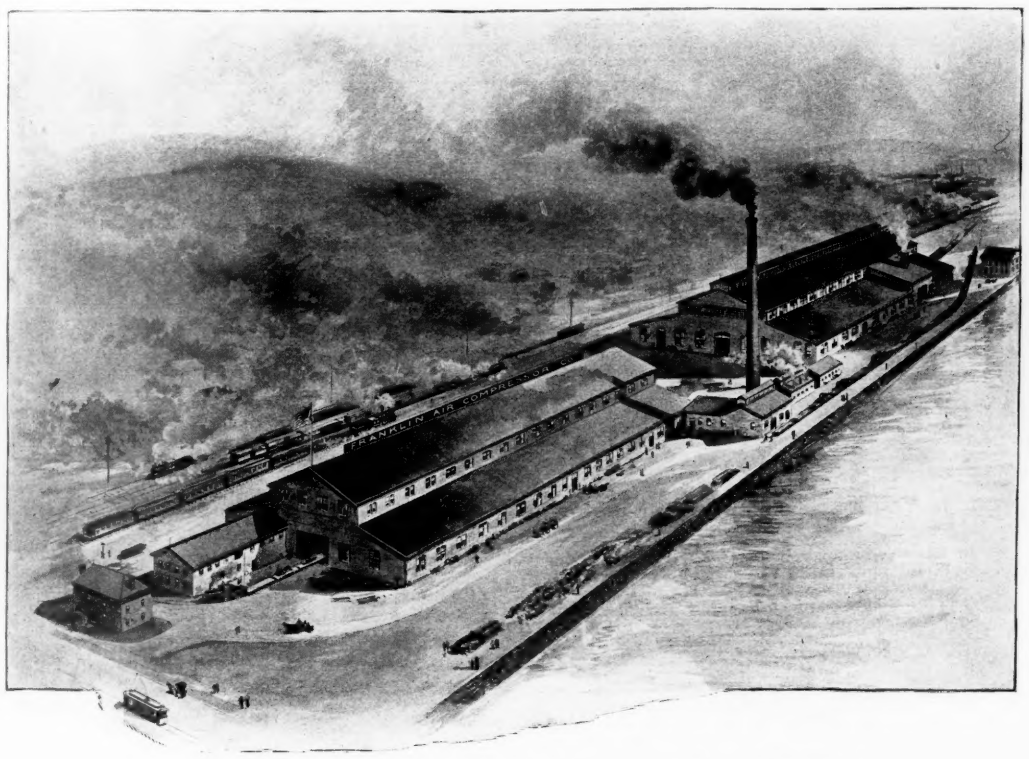
There are 500 ft. of main line shafting, $3^{7}/_{16}$ in. diam., in the machine shop, and it is driven by a system of rope transmission, designed and installed by the George V. Cresson Co., New York, and shown in the plan and elevation in Fig. 3. Eight ropes drive from the engine flywheel through a tunnel to the machine shop and four of these ropes drive each line shaft at either side of the shop. Three separate ropes also run to a jack shaft overhead in the engine room and from this shaft a dynamo and the machinery of the pattern and forge shops are driven.

The forge shop, pattern shop, boiler room and engine room, detached buildings of brick and steel, are shown in the illustration as related to the machine shop. In the boiler room there are two 200-h.p. boilers made by the Pennsylvania Boiler Works, Erie, Pa., and provision is made for doubling this boiler plant and eventually making the total boiler horse power 800. There are two Smith-Vaile duplex boiler feed pumps, and a pump of the same make for fire protection only with a capacity of 1,000 gals. a minute. Coal is delivered by direct drop from cars on an outside switch of the Erie railroad to a narrow-gage coal supply track, the small cars of which run into the boiler room. The coal is fired directly from the small cars without dumping. The boilers are not required to heat the shops and offices, except when extremely cold weather may make it necessary to reinforce the exhaust steam supply by opening the live steam reducing valves. The machine shop and the Superintendent's office building are heated by exhaust steam from the air compressor and the shop engine. The machine shop is heated by the Buffalo Forge Company's system of forced draft, they having furnished a complete blower plant for this purpose. The steam coils, the vacuum pumps, feedwater heaters having a capacity of 1,200 boiler h.p., separators, and thermostatic valves are of Warren Webster make. There are 9,000 lineal ft. of 1-in. pipe in the heating coils. The fan is 110 in. in diam., suitable for a 5-ft. outlet, and it is driven by a 10-in. x 10-in. self-oiling Buffalo Forge engine. The large hot air ducts, after crossing the machine shop and running practically its full length at both sides of the shop, finish in a diameter of 22 in. The usual system of deflectors and vents is used and the ends of the air ducts are, of course, open. The result in ventilation is very satisfactory and the shops were quite summer-like during the recent bitterly cold weather. All steam pipes are covered with Monarch sectional pipe covering, made by the Franklin Mfg. Co. In the Superintendent's office the exhaust steam is drawn through a sufficient number of ordinary radiators by two Knowles vacuum pumps set in tandem in the boiler room and arranged so as to be used in relay.

The pattern and forge shops are well equipped, the forge shop having among other good tools a 1,500-lb. "steam" hammer made by the Morgan Engineering Company, and to be run with compressed air; also a 60-lb. Bradley helve hammer.

In the engine room there is a Brown horizontal 18 in. x 42 in. engine, the nominal rating of which is 250 h.p. at 90 r. p. m. and 100 lbs. boiler pressure. The fly wheel of this engine was made by the makers of the rope transmission drive, and the power plant was designed by Mr. Henry S. Hayward, Jr., Mechanical Engineer for the Franklin Air Compressor Company, who was also in consultation with the Cresson Company when the rope drive was worked out. In the general installation Mr. C. F. Adamson, assistant to Superintendent Cowles, has taken an active part throughout. There is also in the engine room a duplex steam, compound air, compressor which is a home product of the Franklin Air Compressor Company. The steam cylinders are 12 in. x 14 in., and the air cylinders 11 in. and 18 in. x 14 in. This compressor furnishes air for the shop plant complete, including the cranes.

The plan and elevation of piping in the boiler and engine rooms is shown in Fig. 2. The dynamo previously mentioned in connection with the rope drive is of Crocker-Wheeler make, 45 k. w., Class 50-D. This machine



Perspective View of the Franklin Air Compressor Plant, Franklin, Pa.

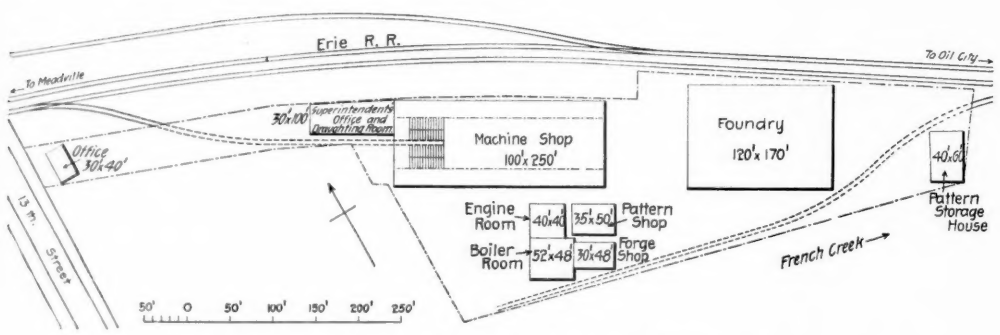


Fig. 1.—General Lay-Out of the Franklin Air Compressor Plant.

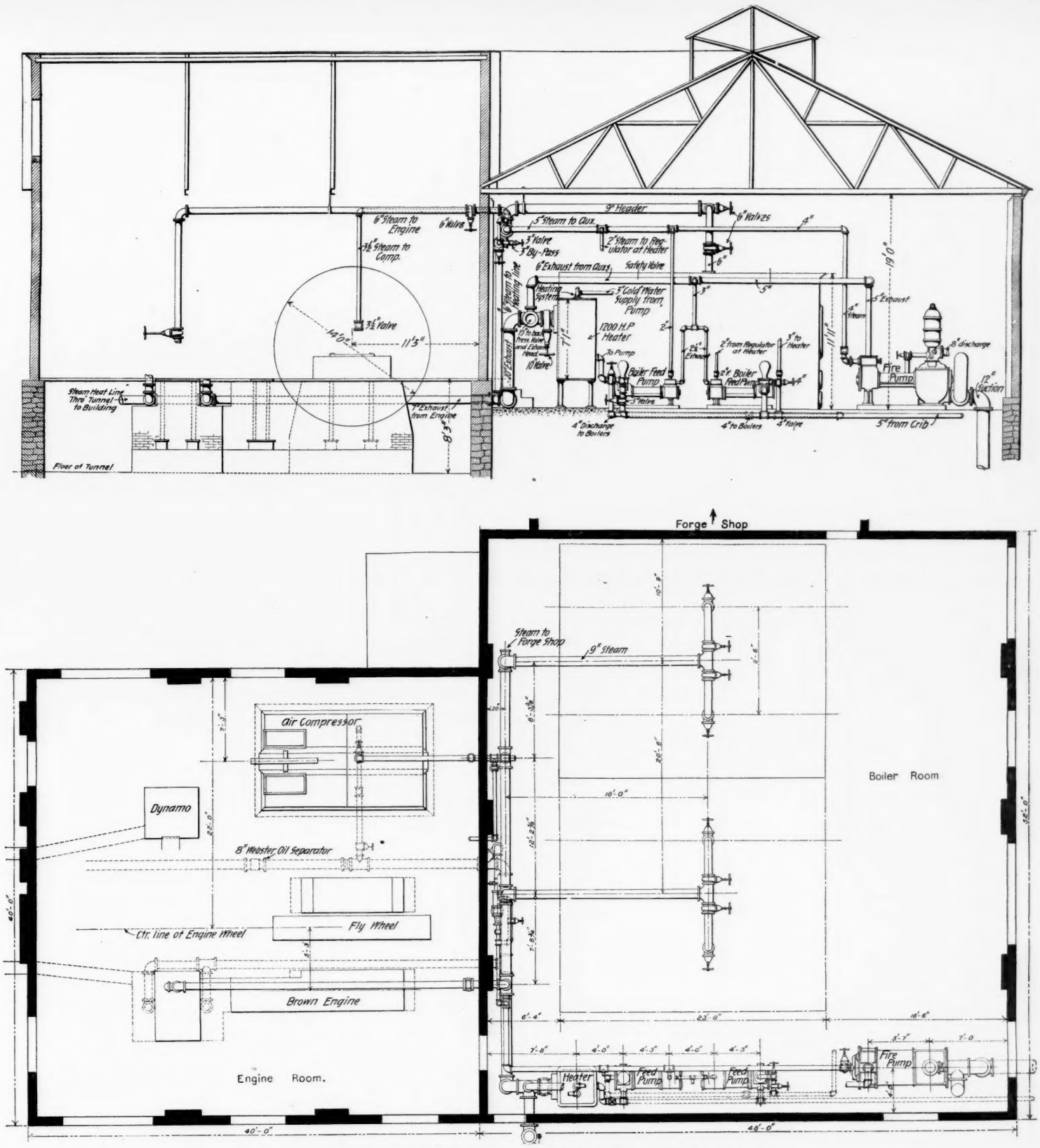


Fig. 2.—Plan and Elevation of Piping in Boiler and Engine Rooms.

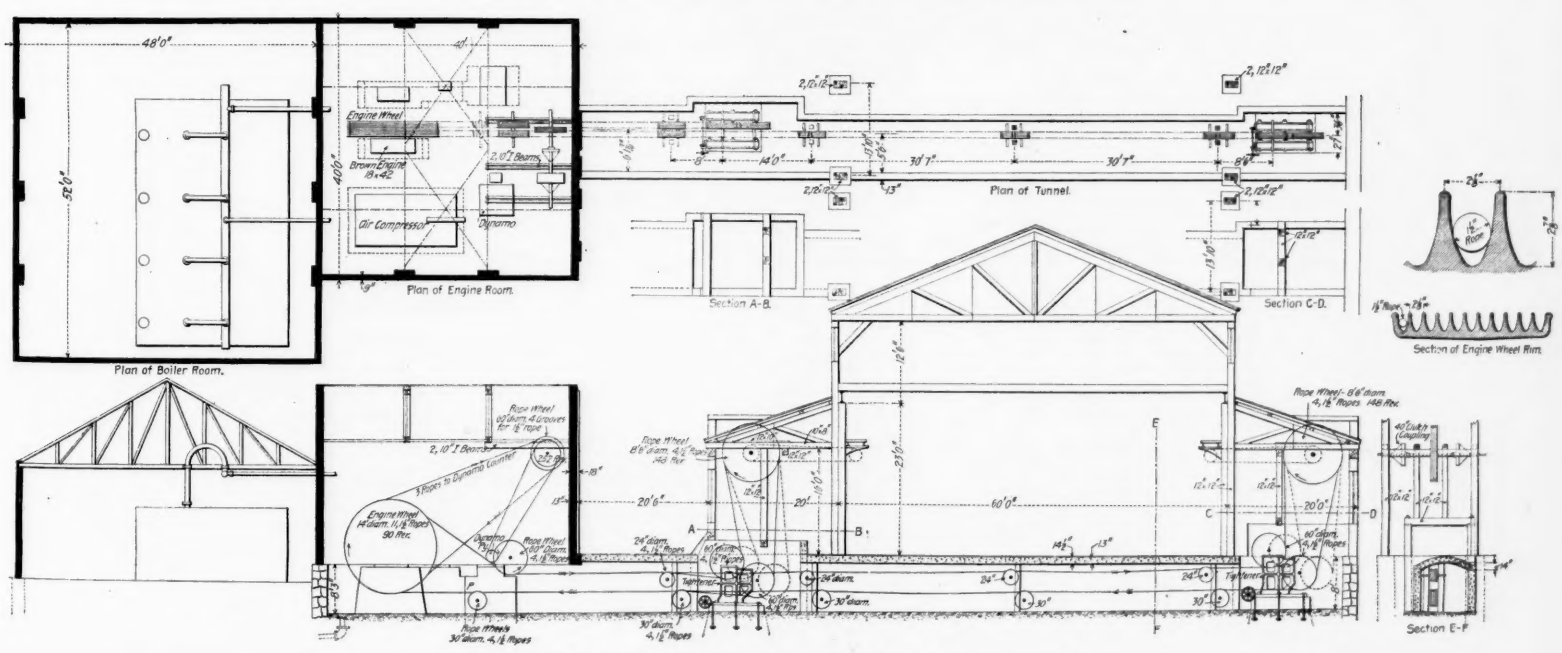


Fig. 3.—Rope Drive in Machine Shop—Franklin Air Compressor Plant.

lights the entire plant, and runs a motor which is used for some secondary driving in the foundry.

The foundry is of steel and brick, 120 ft. x 170 ft.; has a clear story 60 ft. wide; side spaces under the shelving roof 30 ft. each in width, and is in general of much the same outline as the machine shop, but has an upper transom or super-clearstory for additional ventilation. The equipment is largely that of the Whiting Foundry Equipment Company, Harvey, Ill., who furnished among other things a two-ton pneumatic elevator and a No. 6 cupola, there being a place prepared for a second cupola of the same size which will be installed later.

The time clock used is the Rochester Time Recorder, made by the Williard & Frick Mfg. Co., Rochester, N. Y. This clock is placed between the shop and washroom. On either side of the clock is placed a card rack. The one between the shop and the clock is marked "in," the other "out." When the workman enters the shop he takes from the rack marked "out," a card bearing his number and records the time by the clock, and places the card in the rack marked "in." When leaving the shop, vice versa. For piece work this same system is used. When the workman begins a job he records the time as "in," when finished he records it "out."

Electric bells are placed in each department of the plant, and are rung automatically at morning, noon and night by an electric clock, or elechrometer made by the Sempire Clock Co., of St. Louis. The clock is placed in the Superintendent's office, and can be regulated to signal at any time or times required.

Further Economies in Coal and Ore Handling.

BY JOHN M. GOODWIN.

In view of the fact that this country is just beginning to export coal and steel to Europe, the question of how to promote essential economies in the handling and transshipment of the raw products of our mines, becomes of vital importance. Our railroads have entered upon that stage of their career wherein further increase of earnings depends upon improvements in their plant, and methods of administration, rather than in extension of their lines. That the trend of such improvements will be towards doing away with cheap labor by the substitution of improved machinery, is beyond question. To demonstrate our theories in connection with the economical handling of coal and ore especially, we have made the two drawings which appear herewith.

The first, Fig. 1, shows an adaptation of the present existing form of coal trestle to especially accommodate the Goodwin car. With this method of trestle, if a train be made up of cars containing hard coal and cars containing soft coal, the two different kinds of material may be discharged simultaneously, each upon its own proper side of the trestle. The entire operation requires no more time than the discharge of a single car, which is practically instantaneous. There is much time saved in this method by eliminating the necessity for uncoupling and shifting the cars, as well as the time saved through the use of the automatic air hose couplings for the air-brake and air-discharging apparatus. The gain in the saving of labor and in the time of the train itself amounts to something prodigious when the saving of each individual train is multiplied by the number of such trains annually discharged.

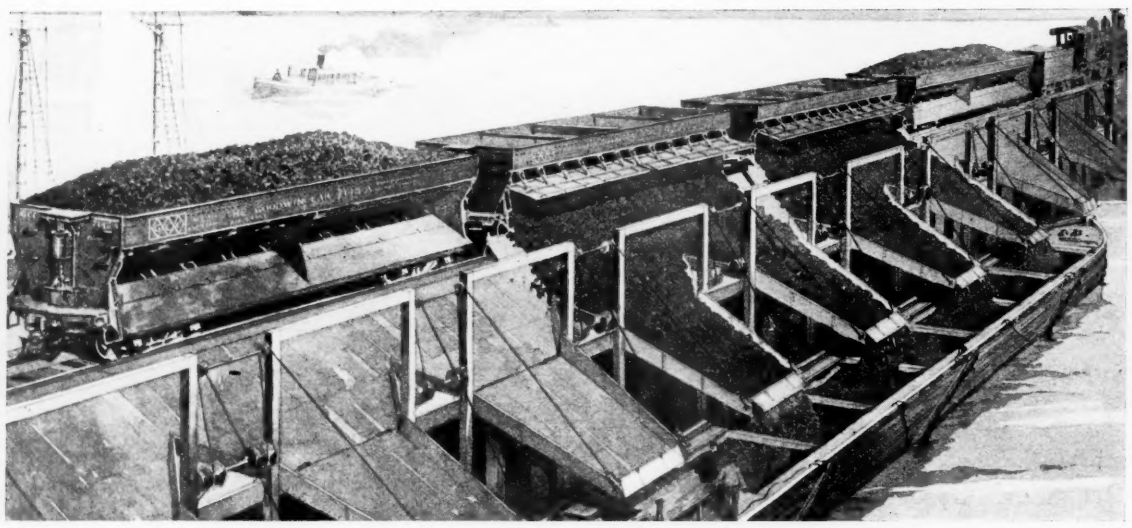


Fig. 1.—Coal Trestle Adapted to Goodwin Cars.

Fig. 2 shows in section the Goodwin patent coal handling trestle in operation with the Goodwin patent scows, barges and storage bins, in all of which apparatus use is made of the same mechanism that gives the Goodwin car its discharging efficiency. In this section, A is the Goodwin car on the trestle; R is the Godwin car on the return track, in position to be loaded through the chute, on the line shown by the arrow P; G is the Goodwin car on the float H; K is the catamaran Goodwin scow; S is the barge under the return track, in position to receive the center discharge from the car R; T is the barge in position to receive the discharge from the catamaran scow K; B, C and D are the continuous pockets, fitted with discharging valves, operated in gangs.

The mechanism of these pockets is similar to that used on the car, and covered by the Goodwin patent. The lines of possible discharge for the material are indicated by dotted lines and arrows. The screens marked E and F are utilized for screening the coal or other material as it passes over the screens. If it is desired to load car G with coal from bin B, the discharge would be on the lines J, M, G, and the screenings will follow the lines J, I, K, and be received in the scow K on the opposite side of the trestle from the car G, into which the coal is being discharged. It will be plainly seen that this operation may be reversed, discharging the coal from the bin D, on the lines N, I, K, the screenings following the line N, M, G, or the coal may be discharged into the barge G, from the bin D, following the lines N, M, G, or from the bin B into the scow K, following the lines B. I, K. When a train of cars arrives on the trestle, its load may be at once discharged on either or both sides, or in the center, and retained in the bin into which it is discharged, until such time as it is desired to transfer the load from the bin into the receiving vehicle at K, G, R or S. Still another advantage of this special construction of trestle covered by the Goodwin patent is the possibility of accommodating the discharge and storage of both hard and soft coal at the same time. This form of trestle also accommodates any of the present styles of gondola, or hopper cars, making it possible to unload flat bottom or center dumping cars that may be mixed in the train with the special Goodwin cars. This trestle as here shown has both an upper and lower deck, especially adapting to it tidewater handling of coal and ore. The lower chute may be used at low tide, and the upper chute at high tide, thereby saving the breakage that would otherwise result from the added distance that the coal would have to drop.

This same principle is designed by the Goodwin Car Co. for coaling locomotives and vessels. In this system of loading the bins are made in lengths as desired, with a given cubic capacity, using say four or five pockets as the full capacity of a locomotive tender, these pockets being arranged to operate one at a time or in gangs, as desired.

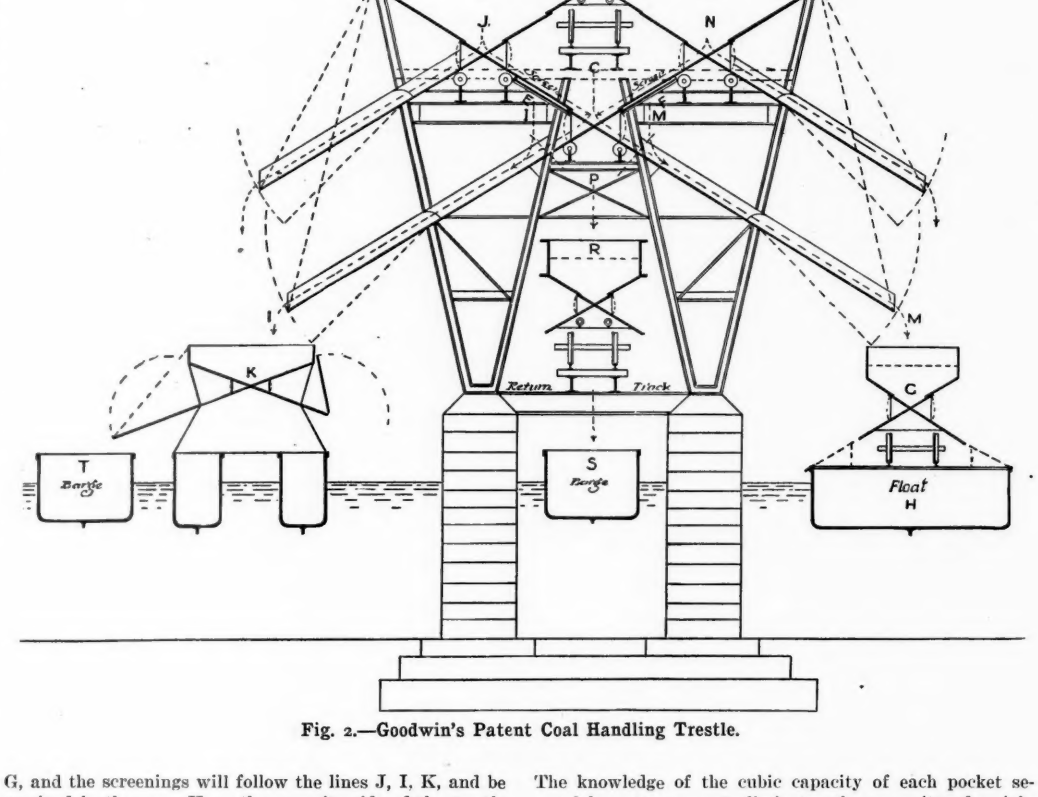


Fig. 2.—Goodwin's Patent Coal Handling Trestle.

The knowledge of the cubic capacity of each pocket secured by measurement eliminates the necessity of weighing the coal as it is discharged.

In a trestle or storage bin of this design the necessary height of the chute is the lower edge of the discharging apron of the Goodwin car, whereas with a hopper or center discharging car the necessary height of the chute is the clearance space under the sleepers, supporting the ties and track. Upon comparing this construction with the center discharge trestle it will be seen that the Goodwin trestle is less than half the usual height required, and that on a dock projecting into the waterway there is only one track in width needed for the handling of a train in place of the three tracks used at present where a center returning track is employed. In place of the usually employed automatic switch to transfer the coal car from either side track to the center returning track, by the gravity of the car there is employed on the Goodwin trestle a drop section at the end of the pier; this section is the length of one car, and is controlled by water grates which drop with the car to the line of the return track under the coal pocket. This drop section resumes its original position as soon as the weight of the car is removed, and is ready to drop with a following car, in about one minute's time.

The merits of the Goodwin patents for handling all dumpable materials, under all conditions, have been generally acknowledged, and set forth in a number of published articles, but the special features for the handling of coal, ore and limestone here shown have not been previously given to the public.

Foreign Railroad Notes.

The new General Manager of the Norwegian State Railroads succeeding Major Segalke, is Hans Nysom, formerly an artillery officer, but since 1876 in engineering and railroad service.

The Belgian Minister of Railroads has notified railroad employees who cannot read and write that they must acquire those accomplishments within a year if they wish to hold their places permanently. There is said to be a considerable number of them.

Train Accidents in the United States in January.

COLLISIONS.

Rear.

3d, on New York Central & Hudson River, near Oriskany, N. Y., a freight train ran into the rear of a preceding freight near a signal cabin, derailing the caboose and four cars. It is said that the foremost train had passed the block signal, but that the engineman, believing that he had passed a signal which was against him, moved his train back into the block section in the rear, and that while the train was in this last named section the collision occurred, the second train having been admitted after the foremost one had passed out of the section.

4th, on Seaboard Air Line, at Daisy, Ga., a passenger train ran into the rear of a preceding freight, wrecking several cars. Three trainwen were injured.

6th, 10 p. m., on Boston & Albany, near Indian Orchard, Mass., a freight train broke in two, and the rear portion afterward ran into the forward one, derailing four cars. A brakeman was killed.

7th, on Boston & Albany, near North Wilbraham, Mass., a special freight train, consisting of an engine and one car, ran into the rear of a preceding freight, wrecking the caboose. A brakeman was injured.

8th, on Central of New Jersey, near Laurel Run, Pa., a freight train ran into the rear of a preceding freight, wrecking three cars. The cars took fire from the coals in the fire-box of the locomotive, and after some minutes one of the cars, containing powder, exploded with great force, breaking the windows in buildings near by.

9th, 3 a. m., on Lehigh Valley, near Wende, N. Y., a freight train broke in two on a descending grade, and the rear portion afterward ran into the forward one, wrecking six cars. One trainman was injured.

11th, on Pennsylvania road, at Holland, N. Y., a freight train which had been unexpectedly stopped was run into at the rear by a following freight, wrecking three cars. The caboose was burnt up.

12th, on Illinois Central, at Belleville, Ill., a freight train drawn by two engines ran into the rear of a preceding freight, wrecking the caboose and seven cars, and badly damaging the two engines. The conductor and one brakeman of the foremost train, who were asleep in the caboose, were killed. The wreck took fire and several cars were burned up.

13th, on Chicago & Alton, near Chicago, Ill., a passenger train ran over a misplaced switch and into the rear of a freight train standing on a side track. Two trainmen injured.

15th, 5 a. m., on Baltimore & Ohio, at Flemington, W. Va., a passenger train ran over a misplaced switch and into the rear of a freight train standing on the side track, damaging the engine, caboose and one freight car. The engineman was injured.

15th, on Delaware, Lackawanna & Western, at Bath, N. Y., a passenger train ran into the rear of a preceding freight, making a bad wreck. Eight cars of lumber took fire, and were burned up. The engineman and fireman were badly injured and one passenger and four trainmen were injured.

16th, on Buffalo, Rochester & Pittsburgh, near East Concord, N. Y., a freight train descending a grade broke in two, and the rear portion afterward ran into the forward one, doing slight damage. The fireman was injured.

16th, on Manhattan Elevated, Third Avenue Line, near Ninth street, New York city, a north-bound passenger train ran into the rear of a preceding passenger train which had stopped on a curve. One brakeman was injured.

18th, on Illinois Central, near Fulton, Ky., a freight train broke in two, and the rear portion afterward ran into the forward one, doing slight damage. The conductor was injured.

19th, on Baltimore & Ohio, near Sand Patch, Pa., a freight train which became uncontrollable on a steep grade collided with an empty engine, making a bad wreck. Two enginemen and one fireman were injured.

20th, 3 a. m., on Western Maryland, near New Franklin, Pa., rear collision of freight trains, wrecking several cars. The caboose took fire from its stove and a brakeman was fatally burned.

20th, 9 p. m., on Southern Indiana, at Terre Haute, Ind., a passenger train ran into the rear of a preceding freight, wrecking the caboose. The fireman was injured.

20th, 11 p. m., on Delaware, Lackawanna & Western, near Poolville, N. Y., a passenger train ran over a misplaced switch and collided with a freight train, making a bad wreck. A fireman was killed and three trainmen and two passengers were injured, one of the latter fatally.

23d, on Deleware & Hudson, near Nineveh, N. Y., a freight train which had been unexpectedly stopped by the breaking of a coupling was run into at the rear by a following freight, and the caboose and two cars were wrecked. Fire broke out, and three loaded cars and the caboose were burned up. The second train had an engine at the rear as well as at the front, and it appears that there was some little delay in signaling the pushing engine when the obstruction was seen.

25th, on Pennsylvania road, at Allegrippus, Pa., a west-bound freight train ran into the rear of a preceding freight, making a bad wreck. The second train was drawn by two engines, and between these two was a caboose in which were a number of trainmen. This caboose was crushed and took fire. One of the trainmen was killed and three others were injured. It is said that the second train had run past a block signal set against it.

29th, on Delaware, Lackawanna & Western, near Elmhurst, Pa., rear collision of freight trains, making a bad wreck. One brakeman was killed and three other trainmen were injured. It is said that the foremost train was not protected by flag.

31st, 4 a. m., on New York Central & Hudson River, at Fort Plain, N. Y., an eastbound passenger train, which had been accidentally stopped a short distance east of the station, was run into at the rear by a following freight train, and the rear car, a sleeper, was wrecked. The 12 passengers in the car were injured, two of them seriously, and the fireman of the freight was injured. It is said that the freight had run past a block signal set against it, and also had disregarded a signal in the hands of a flagman of the passenger train.

31st, on Philadelphia & Reading, at Port Clinton, Pa., a passenger train ran into the rear of a preceding freight. A brakeman was killed and two other trainmen and one passenger were injured.

31st, on Boston & Maine, near Montague, Mass., a slow freight train was run into at the rear by a following fast freight and the caboose was wrecked. Two trainmen were injured, one of them fatally.

And 15 others on 13 roads, involving 3 passenger and 25 freight and other trains.

Butting.

1st, 9 p. m., on Yazoo & Mississippi Valley, at Melton, Miss., butting collision of freight trains, each drawn by two engines. Seven trainmen were killed and five injured.

2d, 2 a. m., on Oregon Short Line, at Hooper, Utah, butting collision of freight trains. One engineman injured.

4th, on Choctaw, Oklahoma & Gulf, near South McAlester, I. T., butting collision of freight trains. One man killed.

5th, on Louisville & Nashville, near Helena, Ky., butting collision of freight trains, wrecking both engines and several cars. Both enginemen were killed, and both firemen injured.

5th, on Louisville & Nashville, near Parkwood, Ala., butting collision of freight trains. Seven trainmen injured, one of them fatally. It is said that the south-bound train disregarded a meeting order.

8th, 7:30 a. m., on Baltimore & Ohio, near Everson, W. Va., butting collision on the bridge over Koon's Run between an east-bound freight train and a west-bound empty engine. The empty engine was running backward. Both engines and three freight cars were damaged, but did not fall off the bridge. Six trainmen killed and three injured; a tramp also was killed. Four of the men killed were riding on the empty engine. The collision was due to the error of a block signalman who, after authorizing the admission of the empty engine, and before it had cleared the block section, admitted the freight.

9th, on Pittsburgh & Western, at Warren, Ohio, butting collision of freight trains. One employee injured.

11th, on Missouri, Kansas & Texas, at Pilot Point, Tex., butting collision, due to a misplaced switch, wrecking both engines and several cars. One engineman jumped off, and was injured.

14th, 8 p. m., on Southern Railway, near Ellerslie, Ga., butting collision between a passenger train and a freight, wrecking both engines. One engineman was killed and one fireman injured. It is said that the freight train was running on the time of the passenger without leave; that the conductor and engineman, having their attention fixed on a freight train for which they had to clear the track, forgot about the passenger train.

17th, on Pennsylvania Lines, at New Philadelphia, Ind., butting collision of freight trains, wrecking the engine and eight cars. A brakeman was killed. It is said that one of the trains disregarded a telegraphic order.

18th, on Grand Trunk, near Locke's Mills, Me., butting collision of freight trains, each drawn by two engines, and both running at full speed. The four engines and 13 cars were wrecked. The wreck took fire, and was mostly burned up; and an explosion occurred in one of the cars. Two enginemen, one fireman and two tramps were killed, and three trainmen were injured. It is said that an operator failed to deliver an order to one of the trains.

25th, 4 a. m., on Alabama Midland, at Dimmick, Ala., butting collision of freight trains, derailing 14 cars. One engineman and one tramp were killed. One of the trains disregarded a meeting order.

26th, on St. Louis, Iron Mountain & Southern, near Palarm, Ark., butting collision between a passenger train and a freight, making a bad wreck. One engineman was killed and two other trainmen were injured.

28th, on Baltimore & Ohio, near Petroleum, W. Va., butting collision of freight trains, one of which was running down grade at high speed. Both engines and 10 cars were wrecked, and the road was blocked a whole day, the wreck occurring in a narrow cut. Five trainmen were killed and one was injured. The west-bound train had left Petroleum without authority. This train, a section of No. 87, was ordered to wait at the station named for two sections of the east-bound train, but the engineman went to sleep, and, awaking just as the first section passed, assumed that it was the second, and at once proceeded westward. The conductor ran over the top of the train in the endeavor to signal the engineman to stop. The conductor of another west-bound train and the conductor of the east-bound train also tried unavailingly to stop him.

28th, on Pennsylvania road, near Bellefonte, Pa., butting collision between a switching engine and a work train, damaging both engines and wrecking two cabooses. One trainman was killed and three were injured.

28th, on Pennsylvania road, near Jersey City, N. J., butting collision of work trains. Three employees injured.

And 9 others on 9 roads, involving 3 passenger and 15 freight and other trains.

Crossing and Miscellaneous.

4th, on Chicago & Alton, near Springfield, Ill., collision between a freight train and a switching engine. Three trainmen injured. There was a dense fog at the time.

4th, on Nashville, Chattanooga & St. Louis, near Memphis, Tenn., collision of freight trains. One engineman injured.

5th, on Texas & New Orleans, at Nona, Tex., a freight train ran over a misplaced switch and collided with a car standing on the side track. A workman was killed and several others were injured.

9th, at Perth Amboy, N. J., a locomotive of the Lehigh Valley, moving backward, pushing a caboose, ran into a passenger train of the Central of New Jersey, at the crossing of the two roads, wrecking the engine. Five passengers were injured.

11th, on Texas & Pacific, near Shreveport, La., collision between a passenger train and a switching engine, due to a mistake in giving hand signals. Two trainmen injured.

11th, on Pere Marquette, near Plymouth, Mich., collision between a passenger train and a freight, wrecking the engines and several cars. Both enginemen and one fireman were killed, and four trainmen were injured. There was a blinding snowstorm at the time. A coroner's jury found that the engineman of the freight train was to blame because he was on the main track when he knew that a passenger train was due; that the other engineman was to blame for coming into the yards at a high rate of speed, and the railroad company "for not supplying its employees with proper division time cards."

17th, on Chicago, Rock Island & Pacific, at Council Bluffs, Ia., an empty engine, which in some unexplained manner started unattended from the roundhouse, ran some distance on the main track and collided diagonally with the rear car of a passenger train, overturning the car. Three passengers were injured. The runaway engine ran about 300 ft. on the ground, and was then rerailed at a frog, and continued on toward Omaha. After running a short distance it met and collided with a passenger train, and both engines were badly damaged. In the first collision a man standing on the ground was killed by the overturned passenger car.

19th, on New York, New Haven & Hartford, at Fall River, Mass., collision of freight trains. One fireman injured.

22d, near Dallas, Tex., a freight train of the Gulf, Colorado & Santa Fe, drawn by two engines, ran into a freight of the Houston & Texas Central at the crossing of the two roads, wrecking the caboose. A brakeman was killed and six other trainmen were injured, one of them fatally.

23d, on Toledo, St. Louis & Western, at Warren, Ind., collision of freight trains, due to a misunderstanding of orders. Three trainmen were fatally injured.

24th, 1 a. m., on Texas & Pacific, at Metz, Tex., collision of freight trains at a meeting point, wrecking one engine and several cars. One fireman was killed.

24th, 4 a. m., on Illinois Central, at Newbern, Tenn., a passenger train ran into some freight cars standing on the main track. Two freight cars wrecked and the engine overturned. Engineman, fireman and one passenger injured.

24th, on Northern Pacific, at Tacoma, Wash., collision of freight trains, due to mistake in signaling, wrecking two cars. One trainman injured.

25th, on New York Central & Hudson River, at Niagara Falls, N. Y., collision of freight cars, caused by a runaway. Four trainmen injured.

27th, on Pittsburgh, Ft. Wayne & Chicago, at Plymouth, Ind., a freight train moving from a side track to the main line was run into by another freight running in the same direction, and one of the engines was overturned. Ten cars were wrecked. One engineman was injured. Three cars of a third freight train on the adjoining main track were wrecked.

27th, on Baltimore & Ohio, at Opequon, W. Va., a locomotive which was started by a leak in the throttle while the engineman was on the ground, collided with a freight train, and six cars were wrecked.

28th, on New York Central & Hudson River, at Weehawken, N. J., an east-bound passenger train ran over a misplaced switch and into a work train standing on the west-bound main track, badly damaging the caboose and two cars. Three employees were killed and six were injured.

30th, on Cumberland & Pennsylvania, at Mt. Savage, Md., collision of runaway cars with a freight train. One trainman injured.

31st, on New York, Ontario & Western, at Cadosia, N. Y., a freight train which had become uncontrollable on a descending grade ran into a side track and collided with a locomotive, wrecking both engines and eight cars. Two trainmen were injured.

31st, on Atlantic City road, at Winslow Junction, N. J., collision between a switching engine and a gravel train. Four employees injured.

And 24 others, on 21 roads, involving 6 passenger and 39 freight and other trains.

DERAILMENTS.

Defects of Roadway.

12th, on Chesapeake & Ohio, near Esmont, Va., a freight train broke through a trestle bridge, and the engine and several cars were wrecked. The engineman and fireman were killed.

13th, on Texas & Pacific, near Hallville, Tex., a freight train was derailed by a broken rail and 14 cars were ditched. A tramp was injured.

13th, on Northern Pacific, near North Yakima, Wash., a west-bound passenger train broke through a trestle bridge which had been undermined by a flood, and seven passenger cars were badly damaged. Four passengers and two trainmen were injured. The train was running slowly and the engine passed over the bridge in safety.

16th, on Atchison, Topeka & Santa Fe, at Siberia, Cal., east-bound passenger train No. 8 was derailed by running over a bridge which had been weakened by fire. All of the cars left the rails, but no person was injured.

16th, on Union Pacific, near Hilliard, Wyo., passenger train No. 1 was derailed by a broken rail and six cars were ditched. Two of them fell down a bank. Eight passengers were injured.

21st, on Wisconsin Central, at Forest Junction, Wis., a work train broke through a bridge which had been weakened by fire, making a bad wreck. Five trainmen were injured.

23d, on Georgia, Southern & Florida, near Hampton, Fla., a pay car train was derailed by a broken rail. The clerk in charge was wounded by a bullet from a rifle in the car which was accidentally discharged.

26th, 4 a. m., on Seaboard Air Line, near North, S. C., a freight train broke through a trestle bridge, and the engine, five freight cars and two new (dead) engines fell with the bridge to the swamp below. A man in charge of the new engines was fatally injured.

28th, on Baltimore & Ohio, near Grafton, W. Va., a passenger train was derailed by the breaking of a frog, and the baggage car was overturned. Two trainmen were injured.

31st, on Northern Alabama, near Natural Bridge, Ala., a freight train broke through a trestle bridge and 14 loaded cars fell to the ravine below. The caboose and the engine both escaped the wreck.

And 6 others on 6 roads, involving 1 passenger train and 5 freight and other trains.

Defects of Equipment.

15th, 8 p. m., on Pennsylvania road, at Noel, Pa., a freight train was derailed by the breaking of the flange of a wheel, and 17 cars of coal were wrecked. Two trainmen were injured.

20th, 5 a. m., on Toledo & Ohio Central, near Marengo, Ohio, a freight train propelled by two engines, one of which was in the middle of the train, was derailed by a brake-beam which fell upon the track, wrecking 20 cars. The runner of the engine in the middle of the train was killed and two other trainmen were injured.

24th, on New York, New Haven & Hartford, near Beacon Falls, Conn., a car in a freight train jumped the track and ran into the Naugatuck River. The cars behind the one derailed were not thrown off, but ran along and collided with the front portion of the train with sufficient violence to derail four more, three of which went into the river. A brakeman was injured. It is said that the first derailment was due to a broken axle.

And 13 others on 10 roads, involving 13 freight trains.

Negligence in Operating.

4th, 7 p. m., on Pittsburgh, Cincinnati, Chicago & St. Louis, near Columbus, Ohio, a freight train was derailed at a derailing switch, and the engine and 14 cars were ditched. A brakeman was killed and the engineman and fireman were injured.

5th, on Cleveland, Cincinnati, Chicago & St. Louis, near Alexandria, Ind., a passenger train was derailed at a misplaced switch, and the engineman and fireman were killed.

5th, on Texas & New Orleans, near Kountze, Tex., a

(*Continued on page 148.*)

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

CONTRIBUTIONS—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

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The field for specialists in the mechanical department is widening and to the profit of the railroads. Indeed the use of these men seems to be the most satisfactory if not the only practicable way in which general plans can be carried out on a large road, standards maintained and the practice on different divisions brought to anything like uniformity. Through these special men the head of the department can bring his influence directly to bear on details to which he himself or the master mechanic can give very little or no attention. But having these details followed up in an intelligent manner has in several instances resulted in surprising savings. The traveling engineer is one of the best known of these specialists and probably next comes the air-brake instructor; on smaller roads one man often does the work of both. A number of roads now employ traveling firemen. Recently we were interested to learn from a superintendent of motive power that he has men whose specialty is valves and valve gear, looking after these details in all the shops of the system. Another man makes locomotive boiler washing a specialty, while still another is in charge of all the car oiling. Others will doubtless be added and in addition one or two men are retained on the headquarters staff who can be assigned to particular jobs as they come up. Of course, such an organization might not be best in all cases, but the suggestion is made here that many roads will find it profitable to employ these specialists.

Air-Brake Maintenance.

The discussion on increasing the efficiency of air-brakes, which has been carried on at recent meetings of the Central Railway Club, has again called attention to the general failure to properly maintain air-brakes. These things have repeatedly been discussed by the Air-Brake Association and apparently the chief difficulty is the lack of systematic methods and suitable facilities for making repairs. There can be no doubt that the eastern roads, where the brakes are not severely taxed, are the most negligent. The roads of the Middle States give more attention to brake maintenance than those farther east but nothing like the intelligent care which air-brakes get on the far western roads having very heavy grades. Retaining valves especially are neglected.

Possibly these conditions will gradually be improved when a plan of the Westinghouse Company to do general repairing of triple valves gets under way. The particulars of this plan were recently announced in a bulletin issued by that company which in general is to accept defective and worn triples, preferably in lots of fifty or more, and overhaul them, charging for the work according to a schedule of prices which seems quite reasonable; no doubt less than the same quality of work can be done for by railroads. To reduce freight charges on such shipments, a repair plant will probably be installed at St. Louis and perhaps at other points.

Another thing brought out by papers and correspondence submitted to the Central Club by Mr. G. W. Rhodes, of the Burlington & Missouri River, is that the Burlington along with other roads is constantly having trans-continental freight refused by the Denver & Rio Grande at Denver, simply because the triple valves have not been cleaned within twelve months. During times of heavy traffic such action is compulsory. This matter is being agitated on the Burlington and the attention of some of the large eastern roads has been called to it. The idea is that if freight agents were aware of the conditions two or three days would sometimes be saved at Denver on through freight if it were loaded in air-brake cars that had had the triple valves cleaned within twelve months; the time specified by the M. C. B. rules. As an example of how things of this kind are usually handled on eastern roads, Mr. W. H. Marshall's reply may be mentioned. In answer to a letter from Mr. Rhodes, he says that he is aware that the Lake Shore air-brake equipment is not maintained in this respect as it should be and recommendations have been made for additional facilities. Further, that now there are no such facilities on the Lake Shore except at West Seneca and there the yard is a joint affair with the New York Central. No doubt this discussion will stir up real interest in this important subject.

A Butting Collision.

A butting collision of passenger trains, killing ten passengers and two trainmen, occurred at Bordentown, N. J., on February 21, and the accident is reported in another column of this paper. The conductor and the engineman of the northbound train forgot or misunderstood their orders. The fullest explanation that we have seen is that of Mr. Abercrombie, the division superintendent, who, as reported in the *Philadelphia Record*, said:

"Conductor Sapp and Engineer Thompson had plain orders to take the 'shipyard siding,' at Bordentown, to await the three sections of the Atlantic City express from New York. They waited until two sections had passed and then started for Trenton. The collision resulted. It was a clear case of negligence or forgetting orders, and Conductor Sapp has admitted as much. They not only had the regular telegraphic order at Bordentown from the train despatcher, but Sapp was told verbally before he started that the southbound train was running in three sections. It is one of the incomprehensible things. Neither the conductor nor the engineer is a new man, and both had been on that run for a long time. Sapp has been in the company's employ for nearly 30 years. He has been a passenger conductor for 14 years, and before that was on freight trains. He has had this run for a long time, and was wholly familiar with it. Since the express has been on its present time of running from New York it has been customary for No. 330, Sapp's train, to meet it at Kinkora, about three miles south of Bordentown. The express was late on this occasion and Sapp ran on to Bordentown, where he let the first section pass and where he got the orders to let the second and third sections pass. He was behind time, however, and after the second section passed he gave the signal to pull away for Trenton, and the crash was inevitable. We have not yet completed the investigation, as the members of the train crews are in such shaken condition that they cannot talk connectedly."

This collision has attracted much attention not only because it occurred near several large cities and involved an important train; but particularly because it occurred on a railroad working thousands of miles of track by the block system. Every editor who comments on the disaster wonders why the block system has not been introduced on a division of the road which is important enough to run a dozen parlor cars on a single train (of three sections). In the absence of more detailed evidence from the injured conductor and engineman it would be premature to try to define with exactness the cause of the collision; but we may observe that one or two very obvious questions are yet to be answered.

It is said that the engineman of the second southbound train gave notice, by whistle, that a third train was following; did the northbound answer this by the prescribed responsive whistle signal? And if not, did the southbound engineman stop to find out why his warning was not acknowledged, and what should he have done under his rules? Did the engineman of the northbound train conform to the very proper rule of not starting until he received a go-ahead signal from the conductor? Down in Alabama, last November, three men were killed in a butting collision due to a failure on this simple rule; the engineman started out without making sure that the conductor, as well as himself, had determined that the start could be safely made. On many roads the first question asked would be whether the fireman and one of the brakemen had read the meeting orders. Whether or not the Pennsylvania rules require orders to be shown to these men, we do not know.

The question whether Conductor Sapp and Engineman Thompson had been at all lax in their habitual conduct under the train rules will also come up for consideration; for not even a long period of immunity from collisions affords assurance on this point. The rule that a conductor and an engineman, running together, shall check each other's errors, is universal and of long standing; but it is one of the hardest to properly enforce.

This fact is perhaps the final straw that forces the conviction that the block system is the only rational remedy for the scores of collisions of this kind that are reported in the newspapers every year. Errors do occur under the block system; and it might be asserted that, even in the present case, the non-automatic block system would not have been free from liability to a similar failure; but it does have the immense advantage that the men responsible for spacing the trains *habitually* deal with one train at a time, and habitually treat all trains alike, not being distracted with considerations of superiority. The signalman in the cabin is also free from the anxieties about making time or assisting passengers, which often take the attention of conductors and enginemen. Again, he guides himself constantly by a written record, lying before him on a desk; this is an advantage over crumpled papers held in the hand combined with the safeguard of whistle and flag or lamp signals.

January Accidents.

Our record of train accidents in January, given in this number, includes 108 collisions, 125 derailments and 10 other accidents, a total of 243 accidents, in which 76 persons were killed and 207 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident as reported make it of special interest.

These accidents are classified as follows:

Collisions—	Rear.	Butting.	Crossing and other.	Total.
Trains breaking in two	7	0	0	7
Misplaced switch	3	1	3	7
Failure to give or observe signal	4	1	7	12
Mistake in giving or understanding orders	0	9	1	10
Miscellaneous	5	2	14	21
Unexplained	20	12	19	51
Total	39	25	44	108

Derailments.

Broken rail	7	Derailing switch	3
Loose or spread rail	1	Bad switching	2
Defective bridge	7	Mistake in signals	1
Defective frog	1	Landslide	4
Broken wheel	3	Washout	1
Broken axle	8	Malicious obstruction	3
Broken truck	1	Accidental obstruction	2
Fallen brake-beam	1	Wind	2
Brake hose burst	1	Unexplained	69
Failure of drawbar	2		
Misplaced switch	6		125

Other Accidents.

Broken side-rod	1	
Cars burned while running	1	
Various breakages of rolling stock	5	
Other causes	3	10
Total number of accidents		243

A general classification shows:

	Collisions.	Derailments.	Other ac'd'ts.	Total.	P. C.
Defects of road	0	16	0	16	7
Defects of equipment	7	16	6	29	13
Negligence in operating	50	12	1	63	26
Unforeseen obstructions	0	12	3	15	6
Unexplained	51	69	0	120	48
Total	108	125	10	243	100

The casualties may be divided as follows:

Killed—	Collisions.	Derailments.	Other ac'd'ts.	Total.
Employees	52	17	0	69
Passengers	1	1	0	2
Others	5	0	0	5
Total	58	18	0	76
Injured—				
Employees	104	44	2	150
Passengers	10	46	0	56
Others	0	1	0	1
Total	114	91	2	207

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass. killed.	Pass. injured.	Emp. killed.	Emp. injured.
Defects of road	1	12	2	10
Defects of equipment	0	0	1	5
Negligence in operating	1	10	57	110
Unforeseen obstructions and maliciousness	0	10	6	15
Unexplained	0	24	3	10
Total	2	56	69	150

Thirty-nine accidents caused the death of one or more persons each, and 55 caused injury but not death, leaving 149 (61 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with January of the previous five years shows:

	1901.	1900.	1899.	1898.	1897.	1896
Collisions	108	108	96	113	51	50
Derailments	125	145	94	130	68	78
Other accidents	10	9	7	14	7	5
Total accidents	243	262	197	257	126	133
Employees killed	69	22	40	39	26	40
Others killed	7	9	23	9	7	7
Employees injured	150	86	80	105	58	68
Others injured	57	64	96	75	42	51
Average per day:						
Accidents	7.84	8.45	6.35	8.29	4.06	4.29
Killed	2.45	1.00	2.03	1.55	1.06	1.52
Injured	6.68	4.84	5.68	5.80	3.23	3.84
Average per accident:						
Killed	0.31	0.12	0.32	0.18	0.26	0.35
Injured	0.85	0.57	0.84	0.70	0.79	0.89

The number of train accidents in the present report is somewhat smaller than the number recorded for January, 1900, but the number of persons killed is very much larger. We find only one case of a fatal accident to a passenger in a passenger train, but the number of employees killed is more than three times the number reported a year ago. As will be seen from a perusal of the record a number of freight train accidents were unusually fatal, no less than 18 employees being reported killed in three butting collisions. Aside from the question of personal injury, the more notable collisions, in the order in which they appear in the list, are as follows: Oriskany, N. Y., on the 3d; Allegrippus, Pa., on the 25th; Fort Plain, N. Y., on the 31st; Melton, Miss., on the 1st; Everson, W. Va., on the 8th; Locke's Mills, Me., on the 18th; Petroleum, W. Va., on the 28th, and Council Bluffs, Ia., on the 17th. The first three and the fifth occurred on lines where the block system is in effect. The collision at Everson, in which six trainmen were killed, appears to have been due to an attempt on the part of an operator to do some permissive block-signaling, with opposing trains, on a single track, by methods of his own devising. In this case the block system was not properly administered; in the other butting collisions mentioned, the trouble may be charged to the lack of any block system.

The most notable derailments were those on the 8th at Laurel Run, Pa.; on the 23d at Fawvers, W. Va., on the 24th at Glenfield, Pa., and on the 27th at Crystal Run, N. Y. The narrow-gage roads in the far West continue to tempt fate, and we have to record two derailments of passenger trains by wind storms.

Ten street car accidents were reported in the newspapers in January, including two butting and two crossing collisions and three runaways; a case of a car being struck by a freight locomotive and a collision due to leaving a gravel car standing on the main track at night with no light. This last was a severe collision, resulting in the death of the conductor, who was acting as motorman. In the 10 accidents the number of casualties was 24; one fatal and 23 non-fatal.

Annual Reports.

Delaware, Lackawanna & Western.—The annual report of this company for the year ending Dec. 31 last is particularly interesting, because it indicates the progress made by the new management in bringing into accord with modern ideas the operating methods of a rich company which had never particularly felt the necessity of introducing the economical methods which so many railroads have been forced to develop to make both ends meet. In the beginning, it may be said that the hoped for progress in readjusting the company's operating methods and in reducing the cost of moving traffic has not been made during the year. The strike of the anthracite coal miners last fall seriously upset the operations of the company, which mined about 6,000,000 tons of coal a year, or 13⅓ per cent. of the production for 1900. The loss of tonnage to the railroad through that strike is estimated at 685,000 tons, while the company was put to considerable expense in keeping mines in proper condition for resumption of work. The terms of settlement agreed to by all the mining companies is stated to mean an increase in cost of labor of 10 per cent.

Besides interruption in traffic and train movement through the coal strike, a variety of other causes prevented a reduction in cost of transportation to the extent that the President had expected to be able to bring about. He gives as the chief reason, however, the inadequate motive power of the company. More than 67 per cent. of the engines carry a maximum steam pressure of only 140 lbs. or under. Moreover, it has been impossible to make full use of heavy new motive power purchased because of light bridges. Nearly $600,000 was expended during the year for new bridges. The replacement of light structures in important divisions has now progressed far enough to permit the company to use heavier power, and it has under contract for delivery during the year 82 heavy passenger and freight locomotives, in addition to 45 new engines purchased during 1899.

The company's heavy balance of net income over fixed charges and the 7 per cent. dividends paid, has enabled the directors to charge the whole cost of new equipment and reconstruction against current earnings. Part of the cost has been charged directly into expenses, which accounts largely for the increase of $1,200,000, or 64 per cent. in the cost of maintenance of way for 1900 and of $121,000 increase, or 4½ per cent., in maintenance of equipment cost, the latter following an increase in 1899 of $615,200, or 13⅓ per cent. Part of the cost of new equipment has been charged against profit and loss surplus, such charges for the year being $211,510 for new locomotives and $661,851 for new cars.

A table in the report gives an itemized statement of the principal improvement charges of the year, the total being $996,671, as against $543,785 in 1899, all these amounts being included in operating expenses. In addition there were charges of $389,129 against the expenses of the coal department for colliery improvements.

New equipment purchased during the year included 46 locomotives, at a cost of $747,315, and 1,150 freight cars at a cost of $911,851, a total expense on the two accounts of $1,659,166, of which $785,804 was included directly in expenses and the remaining $873,363 charged against surplus income, the surplus for the year over the dividends being $896,232.

Comparisons with last year are not only affected by the strike, and its consequence in increased expenses, but by readjustments of accounts, as was the case in 1899. Thus a decrease of $213,140 in miscellaneous income is chiefly due to the fact that the company no longer takes credit in income account for equipment rented to leased lines. As reported in the income account gross transportation earnings were $20,887,763, a decrease of $437,359, coal revenues having fallen off $872,472, merchandise freight and passenger revenues increasing $360,037 in the former and $235,180, being about 6 per cent. in each case, President Truesdale regarding the gain as chiefly due to the reorganization of the traffic department. Net earnings, after taxes were $6,265,484, a decrease of $2,688,428, or 28½ per cent. Miscellaneous income, including $1,200,082 net receipts from the coal department, were $1,842,025, and the balance after dividends is $896,232, a decrease of $710,941. In both years, however, income account has included certain credits and charges which many railroad accountants would regard as properly adjustments in profit and loss account. Thus in both 1900 and 1899 miscellaneous income includes premiums on bonds sold, and charges have embraced advances and accounts written off the books in 1899, these sums being over $1,400,000. Allowing for these items, the company's surplus in 1900 was $739,098 in 1900, against $2,762,135 in 1899.

Northern Central.—The annual report of this company, one of the lines of the Pennsylvania Railroad, though covering the operations of what in these days is regarded as a relatively small company (operating 381 miles of road, and earning $7,845,000 a year, or $20,500 a mile), epitomizes very well the conditions under which the railroads are working at present. It indicates the average extent of prosperity; how that has been obtained, and what means are being adopted both in operating and financial methods to preserve present income, so far as that is possible, by efforts of the management.

The company's increase in gross, for instance, is, so far as the freight traffic is concerned, due entirely to better rates, the tonnage movement having fallen off to some extent; expenses have been increased, chiefly by larger maintenance charges, while in addition over $1,000,000 of the $7,845,000 gross receipts were reported as appropriated for extraordinary improvements. Besides all this, new stock capital was issued to purchase securities of other roads, carrying the same classes of traffic, to secure a voice in their management and thus promote harmony of policy.

Of the $611,994 increase in gross earnings, $571,672 is due to freight revenue, despite the lessened tonnage. While operating charges increased $214,644, the proportion to gross dropped from 73 per cent. in 1899 to 70 per cent. in 1900. Over $116,800 of the larger expenses is due to the increased maintenance expenditure, and but $40,000 to higher transportation charges. The company charged off among its miscellaneous charges $397,926 for extraordinary expenditures not regarded as properly chargeable to capital account, and reported a net income available for dividends of $1,297,558. Surplus over 7 per cent. dividends, paid regularly since 1892, when 8 per cent. was declared, was $613,525. This whole surplus account was then credited to extraordinary expenditure fund, in accordance with the idea established for some years on the Pennsylvania Railroad itself, to create such a fund out of surplus earnings. In 1899 $300,000 and in 1898 $200,000 was likewise appropriated out of surplus income, but these sums did not comprise the entire surplus, as in the past year.

The special development of the last year in the efforts of the railroads to secure stability of rates by the extension of what is now known as the community of interest idea, or the purchasing by one strong railroad into the securities of other connecting or competing lines, is brought out in the financial part of this report. It is stated, for instance, that in the past year the Northern Central Railway has bought 10,000 shares of Baltimore & Ohio preferred stock, 5,000 shares of Norfolk & Western preferred and 10,000 shares of common stock; 15,000 shares of the Chesapeake & Ohio, as well as 10,000 of the Erie & Western Transportation Company and 4,178 shares of the Allegheny Valley preferred and 3,377 shares of common stock. The two latter companies are the only ones directly operated as part of the Pennsylvania Railroad's system.

All these purchases were made from the proceeds of the issue of 28,787 shares of additional stock of the Northern Central, which seems to have been disposed of in the open market. This stock was part of an issue of 80,000 shares, increasing the authorized stock issue from $8,000,000 to $12,000,000, of which $11,642,400 was outstanding on Dec. 31 last. Besides the stock issued for the securities of the above roads, the company issued 50,098 shares to stockholders, being an allotment of one-third of their holdings in April last of $70 per share, the par value being $50 per share. This issue to stockholders was to provide funds for retiring maturing high interest bond issues, and during the year $600,000 six per cent. bonds of the Union Railroad of Baltimore were paid off at maturity, and that property has now no funded debt; in addition $3,934,000 six per cent. bonds were paid off. To provide part of the cost of the latter operation, $200,000 4½ per cent. bonds were sold; otherwise stock replaced bonds, retired in the year.

This conservative method of financing which, while giving holders of the stock (the Pennsylvania Railroad itself owns more than a majority), a good return on their investment, and through reasonable subscription privileges, a share in the special prosperity of the company, also builds up credit and decreases obligations, is further exemplified in the adjustments made in the profit and loss account. Nothing was added to this on account of the ordinary revenue for 1900, the whole surplus, as stated above, being put back into the property. From the sale of the additional stock, however, as noted above, and from other profits, the company realized an extra profit of $2,161,283; on the other hand, however, it reduced the book value of its equipment by $815,416 and of the value of securities held by $464,996, or $1,280,412, leaving the sum of $880,871 to be added to the total profit and loss credit, recorded on Dec. 31 last as $2,345,603.

The loss in the company's tonnage movement during the year seems to have been due chiefly to a falling off in coal and grain traffic. The company is a heavy coal carrier, which explains its purchases in securities of other coal carrying roads last year. In 1900 it carried 4,904,900 net tons of anthracite coal, a decrease of 125,900 tons and 3,547,200 net tons of soft coal, a loss of 306,000 net tons. The total tons moved was 17,032,000, a decrease of 203,600 tons, as against the loss of 431,900 tons in total tons of coal carried. Tons one mile were 1,095 millions, a decrease of 37 millions or 3¼ per cent., but as an offset to this, freight train mileage decreased 6½ per cent. Ton mile revenue was low, 5½ mills, though this is an increase of .68 mill over 1899, and with only a third of this absorbed in increased expenses, ton mile profit was 1.58 mills, a gain of .45 mill. Earnings per train mile were $2.19, a gain of over 33 cents, and net receipts per train mile at 63 cents showed a gain of over 19 cents.

NEW PUBLICATIONS.

The Journal of the Iron and Steel Institute (British). Volume LVIII. Edited by Bennett H. Brough, Secretary. London: Offices of the Institute, 28 Victoria street, London, S. W. New York: Spon & Chamberlain. 1900.

This latest volume of the Journal of the Institute contains the minutes and proceedings of the Paris meeting, including an account of the official and semi-official doings, the President's address and other addresses and the text of numerous papers with the discussion thereon. It also contains the usual notes on the progress of home and foreign iron and steel industries, this latter compilation filling 230 pages.

Railroad Commissioners of New York: Eighteenth Annual Report; Albany, N. Y. A notice of this report was given, from advance sheets, in the *Railroad Gazette* of Jan. 25. The full report is now issued. At least one person ought to be gladdened by the appearance of this work, and that is the man who sold the state printer the paper from which the books are made, for each copy, bound in two volumes, weighs over 7½ lbs. There are two thick volumes instead of one big and one of moderate size, as in former years. Volume I contains, besides the report proper, with full transcripts of decisions, etc., 450 pages of reports of the inspectors of steam and electric railroads, 125 pages of the minutes of the Board, and about 400 pages of the laws affecting railroads. Photographic views are given showing the extensive work done in abolishing grade crossings in Binghamton and several smaller towns.

Eastern Maintenance of Way Association.—The Proceedings of the 18th annual convention of the Eastern Maintenance of Way Association, held at Saratoga last September, are now published in a pamphlet and may be had from the Secretary, F. C. Stowell, Boston & Maine Railroad, Ware, Mass. The volume contains discussions on handling snow, on railroad landscape gardening, on ballast, with special reference to stone and gravel sprinkled with oil, on education of railroad men, flangeless driving wheels, track maintenance, etc.

Street Railway Review.—Under date of Feb. 15 the *Street Railway Review* (Chicago) announces that Mr. Windsor retires as Managing Editor and is succeeded by Mr. Daniel Royse, his interest in the business having been bought by Mr. Kenfield and Mr. Royse. Mr. Windsor is obliged to give his entire attention to the organization and building of street railroads. Mr. Royse has been associate editor for four years. His technical school training was received at Purdue and Cornell and has been supplemented by study abroad. He has been an occasional contributor for the *Railroad Gazette* and is known to many of our readers.

TRADE CATALOGUES.

Car Chairs.—The Richards Chair-Panel Co., Monadnock Block, Chicago, sends a circular with illustrations of chairs for parlor cars, in which the panel forming the back is pivoted in such a way that the upper part of the panel is pressed back a little by the weight of the shoulders and the lower part forward. The head rest is fixed so that when one is reclining it projects a few inches from the panel. The back automatically adjusts itself to movements of the body and is said to afford greater comfort than chairs with rigid backs, and to permit of sitting comfortably at different angles. Chairs designed on the same lines have been used for some time in theaters and have now been adapted to the conditions of parlor cars. The Chicago & Alton is mentioned as running parlor cars so equipped.

Train Accidents in the United States in January.

(*Continued from page 145.*)

freight train was derailed by a misplaced switch, and three trainmen were injured, one of them fatally.

8th, on Delaware & Hudson, near Troy, N. Y., several cars in a freight train were derailed and badly damaged in consequence of a mistake in signals, which caused the engineman of engines at opposite ends of the train to push toward each other.

23d, 2 a. m., on Baltimore & Ohio, at Fawver, W. Va., a freight train was derailed by a derailing switch, and the engine and two cars were overturned. The engineman, who was killed, is believed to have been asleep as he approached the derailer.

And 7 others on 5 roads, involving 1 passenger train and 6 freight trains.

Unforeseen Obstructions.

1st, on Norfolk & Western, near Wayne, W. Va., passenger train No. 3 was derailed by a landslide and the engine was overturned. Three trainmen and three passengers were injured.

2d, on Erie road, near Niles, Ohio, a freight train was derailed by a wagon at a highway crossing, and the engine and six cars fell down a bank. The engineman was killed and the fireman and one brakeman were injured, the former fatally.

4th, on Nevada-California-Oregon road, at Doyle, Cal., a south-bound passenger train was blown off the track by a high wind and four passengers and three trainmen were injured.

4th, on Virginia & Truckee road, at Washington Mills, Nev., the baggage car of a passenger train was lifted from its trucks by a high wind and overturned.

9th, 6 a. m., on Kanawha & Michigan, near Monarch, W. Va., a passenger train was derailed by a malicious obstruction, and the engine and foremost cars were badly damaged. The engineman was injured.

12th, on Northern Pacific, near Porter, Wash., passenger train No. 105 was derailed by the caving in of the roadbed and the engine and first two cars fell with a mass of earth into the Chehalis River. The train was moving slowly. The fireman was injured.

12th, 9 p. m., on Northern Pacific, near Chehalis, Wash., a mixed train was derailed by a landslide, and the engine and three freight cars fell into the Chehalis River. The engineman was injured.

12th, 11 p. m., on Astoria & Columbia River, near Clifton, Ore., a passenger train was derailed by a landslide, and the engine fell into the Columbia River. The engineman was killed, and the fireman was injured.

13th, 11 p. m., on Plant System, near Dunellon, Fla., a passenger train was derailed at a point where spikes had been maliciously removed. The engineman was killed and several passengers were injured.

23d, 3 a. m., on St. Louis, Iron Mountain & Southern, near Walnut Ridge, Ark., a passenger train was derailed at a switch, which is believed had been maliciously misplaced, and three passenger cars were overturned. There were in the train about 60 passengers, but only one person, a sleeping car porter, was seriously injured.

27th, 2 a. m., on Atlanta, Knoxville & Northern, near McFarland, Tenn., a freight train was derailed by a landslide, and the engine and several cars fell into a river. The engineman and fireman were killed and one other trainmen was injured.

28th, on Chesapeake & Ohio, near Richmond, Va., passenger train No. 2 was derailed and the engine and first three cars fell into the ditch. The conductor and fireman were injured. It is said that the derailment was due to an accidental obstruction in a switch.

Unexplained.

2d, on Central New England, near Cottage Grove, Conn., a passenger train drawn by an engine which was running tender first was derailed, and both of the passenger cars were partially overturned. Five passengers were injured.

2d, on Gulf & Ship Island, near Brooklyn, Miss., the tender of the engine of a passenger train was derailed, and, with the engine and first two cars, was overturned. The engineman was killed, and a passenger was injured. The engine was running tender first, at moderate speed.

3d, on Chicago Great Western, near Sargent, Minn., a passenger train was derailed and the baggage car was overturned, took fire and was burned up. Three trainmen were injured.

5th, on Marshall, Timpson & Sabine Pass, near Timpson, Tex., a passenger train was derailed and a passenger car was overturned. Fifteen passengers were injured.

10th, on Hoosac Tunnel & Wilmington, near Hoosac Tunnel, Mass., a mixed train, with a snowplow at the head, was derailed, and the engine and first car were overturned. The engineman and fireman were killed. It is thought that some part of the snowplow caught in a switch.

10th, on New York, New Haven & Hartford, near New Haven, Conn., the rear car of a passenger train was derailed, and a brakeman was injured.

11th, on Northern Pacific, near Ellensburg, Wash., passenger train No. 3 was derailed and several passenger cars were ditched.

14th, 9 p. m., on Boston & Maine, at Penacook, N. H., a freight train was derailed and two trainmen were injured.

15th, on Pittsburgh Junction road, at 21st street, Pittsburgh, a freight train was derailed and two employees were injured.

18th, on Delaware & Hudson, at Saratoga, N. Y., a freight train was derailed, doing slight damage. A crossing watchman, thinking himself in danger from the derailed cars, jumped out of his cabin and broke his leg.

24th, 6 p. m., on Pittsburgh, Fort Wayne & Chicago, at Glenfield, Pa., an east-bound passenger train was derailed while passing from track No. 4 to track No. 3, and the engine was overturned. The engineman was injured. The train entered the cross-over track at about 60 miles an hour.

27th, on New York, Ontario & Western, near Crystal Run, N. Y., a 30-ton gondola car in a freight train was derailed on a descending grade by a broken truck, and ran down a bank. The conductor, sitting in the cupola of the caboose, saw the car leave the train, and at once took measures to stop, but by the time he got to the middle of the train the front and rear portions had been automatically coupled together, and it was necessary to examine the list of cars to discover which one had dropped out.

29th, 6 a. m., on Manhattan Elevated, at Ninth avenue and 53d street, New York city, an empty engine was derailed, blocking the road three hours.

30th, 3 a. m., on Southern Railway, at Tuscumbia, Ala., a sleeping car in a passenger train was derailed and fell against an engine standing on a side track. Three passengers were injured. Two passenger cars were badly damaged.

And 55 others on 41 roads, involving 6 passenger and 49 freight and other trains.

OTHER ACCIDENTS.

27th, 1 a. m., on Wabash road, at Sands, Mo., a freight train, consisting of three tank cars filled with lubricating oil and gasoline, took fire, presumably from a hot journal, and was entirely destroyed, except the locomotive. The gasoline tank exploded and two trainmen were slightly burned.

And 9 others on 8 roads, involving 8 passenger trains and 1 freight.

TECHNICAL.

Manufacturing and Business.

W. O. Jacquette, formerly Comptroller of the Pressed Steel Car Co., with office in New York, has been appointed District Manager, with headquarters in Chicago.

The business of William C. Baker will be continued as heretofore under the same management which has been associated with Mr. Baker during the past 10 years.

The Smith Car Door Co., 1516 Monadnock Block, Chicago, will furnish the doors for the 1,000 stock cars recently ordered by the Chicago, Burlington & Quincy from the American Car & Foundry Co.

J. C. Halladay, for many years Western Sales Agent of the Pickering Spring Co., with headquarters at the Great Northern Building, Chicago, has resigned to accept a position with the Chicago Pneumatic Tool Co., as manager of a department just established.

The H. W. Johns Mfg. Co. has brought out a line of finishes known as lustral finishes. They have various qualities for exterior finish, interior finish and floors. They are made especially for these various purposes, and are indorsed by practical wood finishers all over the country.

The new plant of the Sharon Steel Company, Sharon, Pa., is rapidly nearing completion. The rod mill and group of wire and nail mill buildings, together with a number of others, all of steel frame construction, were designed and manufactured by Wm. B. Scaife & Sons, Pittsburgh, Pa. One of the larger buildings is 70 ft. x 1,260 ft.; another 70 ft. x 840 ft.

The Standard Pneumatic Tool Company, of Chicago, makers of the "Little Giant" air tools and appliances, have moved their New York offices from 619 Washington Life Building, to more commodious quarters at 611-612-613 of the same building, this being necessitated on account of the increase in their business in Eastern and foreign territory during the past few months. All shipments for customers in the district just mentioned will be made from New York instead of Chicago, thus expediting delivery.

The Osborn Engineering Co., Cleveland, Ohio, have been selected by the Cleveland & Southern Railroad Co., of Cleveland, Ohio, to prepare all of the plans and specifications and superintend the construction of their new electric line, which will run from Cleveland to Medina. The Osborn Engineering Co. will prepare the plans and specifications for bridges, track construction, overhead work, car barns, powerhouse, mechanical and electrical equipment, and rolling stock. The field surveys are now being completed, and work on the construction of this road will be pushed as fast as possible.

The Canadian Bridge Company, Ltd., which was incorporated in Ontario last November, has a capital of $250,000. The present officers are: President and Engineer, Francis C. McMath; Secretary and Treasurer, Burnham S. Colburn. The company has just put into operation its shops at Walkerville. The main shop is a steel frame building, designed to make railroad and highway bridges and structural work, and is 101 ft. wide by 560 ft. long, at the rate of 1,000 tons of finished product per month. The new company has an office in the Temple Building, Toronto, with Henry F. Duck in charge as Resident Engineer.

Iron and Steel.

The American Bridge Co. has received a contract for the steel work for the electric power plant, to go to Ultimo, New South Wales, Australia.

The New York Bridge Company was incorporated in New Jersey Feb. 26, with a capital of $300,000 to build bridges and other structures and to do a mining and manufacturing business. The incorporators are: Hector M. Hitchings, of New York; Melvin G. Pallister, of Hastings-on-the-Hudson, and Irving V. Dorland, of Arlington, N. J.

The Navy Department awarded conditional contracts for the new protected cruisers, for which bids were received Feb. 1, to Neafie & Levy on Feb. 10, and to the Newport News Shipbuilding Co., and the Bath Iron Works on Feb. 12. The bidders have now been notified that unless they reach a final agreement with the Navy Department by March 2, bids for the ships will be readvertised.

Steel Cars.

Among the recent shipments made by the Pressed Steel Car Company are consignments of large pressed steel hopper cars and flat cars for the American Sheet Steel Company, the flat cars going out Feb. 15. A few days ago the Oliver Iron and Steel Company received a consignment of flat cars and flat bottom gondolas with removable sides. McKeefrey & Co., of Leetonia, Ohio, have given the Pressed Steel Car Company an order for flat cars. These cars are all from 36 to 40 ft. long, 9 ft. 4 in. wide, and weigh about 29,900 lbs. each. The capacity of the cars is 110,000 lbs. Several of the largest manufacturing concerns in Pittsburgh are now using Pressed Steel Cars, among them being Jones & Laughlins, the Pittsburgh Plate Glass Company, the American Steel & Wire Company and the Etna Iron Works. Orders for cars are coming in from manufacturing firms in all parts of the country, among these being the Bethlehem Steel Company, the Lorain Steel Company, the Lebanon Furnaces, the New Jersey Zinc Company, Carnegie Steel Company and the Reading Iron Works.

A New Design of Pressed Steel Car.

Among recent shipments by the Pressed Steel Car Company is a pressed steel car for the Chesapeake & Ohio Railroad which is somewhat different in shape from the other large cars turned out by this firm. It is self-clearing, although the hoppers do not go down in an angle, but the load is dropped by drop doors operated in a manner similar to the doors on a flat bottom gondola car. This gives the car an appearance similar to the high side flat bottom gondola car. The car has a carrying capacity of 55 tons of bituminous coal, the light weight being 38,200 lbs.; capacity level full 1,900 cu. ft.; with 10 in. average heap 2,122 cu. ft. The car was designed specially to meet the local conditions of the Chesapeake & Ohio, especially in connection with the dumping of the load at Newport News, Va. The cars will be used for coal to Newport News. The cubic capacity of these cars is greater than any similar car built, as will be noted in the statement that it has a capacity of 55 tons of bituminous coal. The general dimensions are as follows: 29 ft. 6 in. long, 10 ft. wide, and 11 ft. 2 in. high. The truck frames are of the standard pressed steel diamond type, cast iron chilled wheels, M. C. B. standard axles and journal bearings, pressed steel brake-beams and Schoen draft rigging.

An Electrical Engineering Laboratory for Union College.

A bill has been introduced at Albany designed to permit the state to establish an electrical engineering laboratory at Union College, and to provide for its maintenance. A good electrical engineering school is already in existence at Union College and the present movement is simply to get the state to build and equip a laboratory. The bill carries an appropriation of $150,000—a modest estimate. It also provides for an annual appropriation of $25,000 for investigation, experiment and instruction. The Trustees of the College are to deed to the state a site for this laboratory on the provision that the land and buildings shall always be used for the purposes of the laboratory. Another provision is that 100 free scholarships in electrical engineering shall be available for students who have been residents of the state for at least one year immediately preceding their application. These scholarships are to be distributed among the senatorial districts of the state on the basis of one four-year appointment from each district in each senatorial term of office, 25 appointments from the whole state being made each year. The appointments are to be made by the Department of Public Instruction of the state after competitive examinations, to be held in each county. The examinations are to be by county superintendents and school commissioners, the question papers to be prepared by the Department of Public Instruction on subjects designated by the President of Union College. It is hardly necessary to point out that Union College has extraordinary advantages in the close neighborhood of the great works of the General Electric Company. Indeed, the students already have certain special privileges in the General Electric Works, and the course of instruction has been prepared with the aid and suggestions of the officers of that company, and certain days in the week the students are permitted to visit the shops. Two classes in electrical engineering have been graduated already and we believe that most of the members of these classes have found employment at once with the General Electric Company.

M. C. B. Standards.

The M. C. B. Association Committee on Modification of Standards, etc., has issued a circular asking for suggestions in reference to the modification of established standards and recommended practice. A few changes already suggested are noted in the circular. Mr. A. M. Waitt, Superintendent of Motive Power and Rolling Stock of the New York Central & Hudson River Railroad, Grand Central Station, New York City, is Chairman of the Committee.

Roundhouses.

The Master Mechanics' Committee on Arrangements of Accessories of a Modern Roundhouse has issued a long circular giving 40 items on which information is requested. Answers should be sent to Robert Quayle, Superintendent of Motive Power and Machinery of the Chicago & Northwestern Railway, Chicago, Ill.

Floating in a Bridge.

The Delaware, Lackawanna & Western Railroad Company has recently built a heavy bridge across the Hackensack River, Morris & Essex Division, using the piers and abutments of the old lighter bridge. As the suburban traffic on this division is very intense, considerable contrivance had to be used to change the bridge without stopping trains. The draw span was built on false works along shore, a little way up stream from the bridge, and last Sunday the old draw span was

floated out and the new span floated in. Traffic was stopped from eight o'clock in the morning till five o'clock in the afternoon, which was no great hardship, as Sunday trains are not numerous. The methods of doing this kind of work have now become quite familiar, and it is hardly necessary to describe this particular case.

United States Patents.

The report of the Commissioner of Patents for the year ending Dec. 31 is received. In that year the total of patents and reissues amounted to 26,499, being more than 900 in excess of the number issued in the preceding year, and in fact considerably more than were ever before issued in one year. The total for 1845 was 503,, and the number increased pretty steadily year by year, although there was an occasional falling off. For instance, in the first three years of the Civil War the patents issued not only ceased to increase in numbers, but actually diminished as compared with two years preceding; and again in 1894, '95 and '96 there was a decline in this sort of activity showing the effect of the industrial depression of those years. Proportionately to the population the greatest number of patents issued last year was to citizens of the District of Columbia. This, however, should probably be ruled out of the comparison, as there are special reasons why inventors should be domiciled in the District. Taking the states of the Union the Connecticut Yankee leads in inventive fertility, the issues in 1900 to citizens of that state having been at the rate of a patent to every 1.203 inhabitants. Massachusetts, Rhode Island, New Jersey, New York, Colorado and Illinois follow in the order named, patents having been issued in each of those states at the rate of more than one to every 2,000 inhabitants. The least intellectual activity of this sort is found in South Carolina, where the patents issued numbered one to every 28,517 citizens. North Carolina, New Mexico, Mississippi, Alabama, Arkansas and Georgia also stand low in this list, as in fact do all of the Southern states except Maryland, which is reasonably prolific, having received one patent to every 3,742 citizens.

Some Heavy Street Cars.

The Wason Manufacturing Company, of Springfield, Mass., has recently delivered to the Milford, Attleboro & Woonsocket Street Railroad Company two large and handsome cars. They are 42 ft. 8 in. long and vestibuled, with 48 seats. Thirty-two passengers may be seated in cross seats with reversible backs, while others are seated in fixed seats at the ends and in the vestibules. The seats in the vestibules are for smokers. The cars have double trucks with four Westinghouse motors, aggregating 120 h.p. for each car. They have air-brakes, and are fitted in every respect with the most modern details.

A Modern Manifold Plant.

The new plant of the General Manifold Company, being built at Franklin, Pa., and referred to elsewhere in this issue, is for many reasons an interesting industrial establishment. The name "Manifold" gives an intimation of the nature of the work this factory will turn out, and it is only necessary to say further that the prepared forms which it is to make will include every conceivable form wherein it may be desirable to make a duplicate or manifold copy of the contents. Particular attention will be given to railroad office work, from a telegraph blank to the most involved forms of sheets, of which it is necessary to make copies. The plant will have many new things in the way of machinery, particularly printing presses, that are the direct outcome of the studies by Mr. John A. Hill, who is Mechanical Engineer for the company. Mr. Hill's experience in practical railroading and his close association with railroad operation have peculiarly fitted him for the work of which he is in charge.

Railroad Material for Ecuador.

The report comes that contracts have been placed through Messrs. Dutilh-Smith, McMillan & Co., of Philadelphia, for considerable railroad material for the Guayaquil & Quito Railroad of Ecuador, a road 300 miles long, now building. The Carnegie Company is said to have the contract for 46,000 tons of 56-lb. rails, of which 6,000 tons have been shipped. The Baldwin Locomotive Works will build 18 locomotives and the Lima Locomotive & Machine Company will build two. The American Car & Foundry Company is to furnish 300 freight cars and the Jackson & Sharp Company 20 passenger coaches. It is said that further contracts for 25 locomotives and 1,700 freight cars will be placed at once.

Cars for Scotland.

The American Car & Foundry Company has obtained a contract through Messrs. Dutilh-Smith, McMillan & Co., of Philadelphia, for 20 60,000 lbs. capacity steel cars for the Caledonian Railway of Scotland.

Proposals Wanted for Havana Sewer Work.

Bids are asked until April 3 for furnishing the materials and for building the proposed sewerage system and street pavements at Havana, Cuba. The bidder must deposit $500,000 as a guarantee of good faith. The contractor must give as security $1,000,000 in cash or bonds, and must pay the government $250,000 for reimbursement for expenses incurred by the government. These expenses were for payment to M. J. Dady & Co., of Brooklyn, of the above amount to be released from all claims of said firm in regard to the contract with the Spanish Government. The work must be finished in four years. The period of maintenance is for five years for the sewers and one for the pumping stations. Lieut. W. J. Barden, Corps of Engineers, U. S. A., Chief Engineer of Havana, or Alexandro Rodriguez, Mayor of Havana, will furnish further details.

Tests of Fireproofed Wood.

The Assistant Secretary of the Navy last week sent to the Senate, in response to an inquiry from that body, the report of Assistant Naval Constructor H. G. Gillmor, U. S. N., who supervised the tests of fireproofed wood made at the Washington Navy Yard last December. The tests were made to determine whether or not wood taken from different parts of the torpedo boat "Winslow" had, in the five years since it was treated, lost its fireproof qualities. The wood was white pine, ash and butternut, and four different kinds of test were made, the stove test, hot plate test, hot rivet test and splinter test. In the first shavings and kindling wood saturated with kerosene were burned with the pieces of fireproofed wood laid on top. In the bottom of the stove was placed waste saturated with kerosene. After the shavings and kindling were entirely consumed, the fireproofed wood ceased to give off any flame or glow, and was found charred from 1/8 to 3-16 in. from the surface, but entirely sound and free from charring inside. In the hot plate test a steel plate 9 in. wide, 2 ft. long and 1/2 in. thick was heated until bright red on the surface, and immediately on removal from the furnace a specimen of each kind of fireproofed wood was laid on it and left so long as there was any flame from the wood. The ash specimen first ceased to give off flame, then the butternut and the pine last. All were found charred only on the surface, free from ash and with no tendency to glow. In the hot rivet test rivets were heated in the furnace to a driving temperature, and laid upon the surface of the specimens. At first some flame was given off, but this soon disappeared, the charring was limited, and there was no ash where the rivets were in contact with the wood. In the last test splinters were held over the flame of a Bunsen burner burning coal gas. Flame was given off, while specimens were in contact with the fire, but ceased at once when removed, and no ash formed.

THE SCRAP HEAP.

Traffic Notes.

The Seaboard Air Line announces that the mileage tickets of the company, issued at $25 per 1,000 miles, are now good throughout the lines of the system, including those in Florida.

A press despatch from Chicago says that the Transcontinental roads have agreed upon the prices which they will bid for carrying soldiers to and from the Pacific Coast, and also have agreed on the percentages of the total traffic which each company will accept.

The conference of presidents of the railroads west of Chicago, which was to have been held in New York city on March 6, has been postponed for about one month. Newspaper reports indicate that there is considerable rate cutting, and that uneasiness on this point is what has made it necessary to postpone the meeting; but not many definite instances of irregular rates are given.

The Union Pacific is to make a large number of experiments in the cultivation of grasses in Nebraska and Eastern Wyoming. It is proposed to plant a number of kinds at each station and watch the growth of each specimen. This experiment is promoted by the freight department, with a view to determining the best localities and the best kinds of grass for feeding cattle.

Arrangements have been made by the Erie and the Pennsylvania Lines for through passenger service during the coming summer between Buffalo and the Southwest by way of Akron and Columbus. The traffic managers of the respective roads appear to think that the travel to and from the Pan-American Exhibition at Buffalo may warrant through sleeping cars between that city and Cincinnati, Louisville and St. Louis.

The roads west of Chicago have agreed to moderate their strife for the business of the Epworth League convention to be held in San Francisco next July. It is alleged that some of the roads were very liberal with free tickets to the representatives of the League, with whom contracts were made, and at a conference of passenger agents in Chicago the representative of the Burlington said that to keep even with his competitors he ought to have leave to issue 2,000 free tickets to the representatives of the League.

International Correspondence School.

Saturday evening, Feb. 23, the International Correspondence School gave a reception in its new club rooms on the seventh floor of the Manhattan Building, Chicago. There were cards and dancing until 11 o'clock, when refreshments were served.

Disastrous Collision Near Bordentown, N. J.

On the afternoon of Feb. 21 a butting collision of passenger trains on the Amboy Division of the Pennsylvania Railroad between Trenton and Bordentown, N. J., resulted in the death of 10 passengers and two trainmen and the injury of four trainmen and about 30 passengers. Most of the passengers who were killed were Italian laborers riding in the smoking car of the southbound train.

The trains in collision were northbound regular accommodation train No. 330 and the third section of southbound Atlantic City express train No. 495. The southbound train being late, a telegraphic order was issued requiring the northbound to meet the second and third sections of the southbound at a siding near Bordentown; but after the second southbound section passed the northbound started out, and had run less than a mile when it met the other train. Both engines and the forward cars of both trains were wrecked. The wreckage took fire, and some of the bodies of the dead were so burned as to be unrecognizable. The injured persons suffered severely from cold, as no medical assistance (except that of one medical student) was secured until about two hours after the collision. Conductor Sapp and Engineman Thompson of the northbound train were both injured, and their forgetfulness of their order is not yet fully explained. Both were experienced men and familiar with the run. It is said that the second section of the southbound train gave the usual whistle signal at the siding, calling attention to the fact that it carried green signals to show that a third section was following.

Technical Schools.

University of Pennsylvania.—The trustees announce that a donation of $25,000 toward the fund for a building, in which the three departments of mechanical, civil and electrical engineering are to be located, had been made by Burnham, Williams & Co. (Baldwin Locomotive Works). The project, it is estimated, will cost between $400,000 and $500,000. The building in contemplation will accommodate 500 students.

Cornell University.—Major W. P. Van Ness, U. S. Army, has been ordered to duty as professor of Military Science and Tactics at Cornell University, Ithaca, N. Y.

The River and Harbor Bill.

The River and Harbor bill as reported to the Senate by the Committee on Commerce last week carries a total appropriation of $50,164,526. This is a reduction of $1,193,881 on the appropriation for the next fiscal year, and of $8,577,008 on authorized continuing contracts, or a reduction of $9,770,889 in all, from the bill as it passed the House of Representatives. The reductions were made by cutting all immediate cash appropriations of over $50,000 by 25 per cent. and all appropriations of over $300,000 for continuing contracts by 33⅓ per cent. The item providing for a depth of 40 ft. in Buttermilk Channel, New York Harbor, has been amended by appropriating $112,500 for continuing the present improvement, the committee being of the opinion that the larger project may wait until increased depth is secured in contiguous channels now under contract. The larger new items inserted by the Senate Committee amount to $1,158,000 for immediate appropriations and $3,033,758 on contracts, and among them are: For Curtis Bay Channel, Baltimore Harbor, $50,000, and $146,000 on contracts; for Biscayne Bay, Florida, $150,000 and $466,667 on contracts; for Galveston Channel, Texas, $112,500, and $150,000 on contracts; for Allegheny River, dam at Natrona, Pa., $50,000, and $239,622 on contracts; for Ohio River, dams 1 to 6, $243,000; for Oakland Harbor, California, $50,000, and $612,135 on contracts; San Pedro inner harbor, California, $112,500; Tacoma Harbor, Washington, $50,000, and $262,667 on contracts. The act of 1900 appropriating $300,000 for the South Pass of the Mississippi River is also reenacted.

An English Engineer on American Car Lighting.

A number of weeks ago Mr. E. W. T. Richmond, Gas Engineer and Manufacturer in England, visited the United States to study our practice in gas engineering, and several articles descriptive of what he saw are published in the London *Journal of Gas Lighting, Etc.* In the issue of Feb. 5, he mentions especially the Pintsch car lighting and he says: "During my frequent night railway journeys I had ample opportunity to judge of the effect of this system of lighting the cars, and I am enabled, by the courtesy of the company, to give an illustration, showing its use in the luxuriously appointed cars of the American lines. There is a warmth and richness about the light which cannot be approached by the electric light, besides being infinitely better for the eyes to read by. The management of several American railroads have applied the Pintsch gas range to the dining buffet cars and it has proved a no mean factor in the making of contented travelers by supplying hot and satisfying meals."

The German Railroad in Shantung, China.

The rolling stock of this line consists now of eight tender locomotives and 228 freight cars. Of the rails, 60 kilometers were laid at the middle of December last. The first section of the line, that from Tsingtau to Kiao-Chau, 74 kilometers in length, will be opened for traffic on April 1, this year. Privy Councillor Von Hansemann, a well known Berlin banker, is the president of the company.

CAR BUILDING.

The Michigan Central is asking bids on 2,000 box cars.

The Southern will order 2,000 to 2,500 freight and 25 passenger cars.

The Colorado Midland is in the market for 200 freight cars and six chair cars.

The Northern Pacific has ordered 450 stock cars from the South Baltimore Car Works.

The Southern Pacific has ordered 500 tank cars from the American Car & Foundry Co.

The Colorado & Southern is in the market for 300 to 350 60,000-lb. capacity coal cars.

The Wheeling & Lake Erie has ordered 500 coal cars from the South Baltimore Car Works.

The Central Commercial Co. is having one tank car built by the American Car & Foundry Co.

The Sierra of California is having two freight cars built by the American Car & Foundry Co.

The Oregon Railroad & Navigation Co. is in the market for 300 80,000-lb. capacity freight cars.

The Morrell Refrigerator Line is having one freight car built by the American Car & Foundry Co.

The American Fast Freight Line is having three freight cars built by the American Car & Foundry Co.

The Cincinnati, Richmond & Muncie has ordered three passenger and 100 box cars from the Laconia Car Co.

The Lake Shore & Michigan Southern has ordered 1,500 coal cars from the American Car & Foundry Co.

The Lake Tahoe Ry. & Transportation Co. is having three freight and one passenger cars built by J. Hammond & Co.

The Indiana, Illinois & Iowa has ordered 500 80,000-lb. capacity gondola cars, for April and May delivery, from the American Car & Foundry Co.

The Mexican International has ordered 20 steel cars of the Sterlingworth patent from the Southern Car & Foundry Co. They will be built at the Anniston plant.

The Chocktaw, Oklahoma & Gulf has ordered five chair, four mail and express and one baggage cars, and one first class and five second class coaches, from the American Car & Foundry Co.

LOCOMOTIVE BUILDING.

The Southern will order 20 locomotives.

The Texas & Pacific is preparing specifications for 25 locomotives.

The Illinois Central will soon be in the market for passenger locomotives.

The Black Hills & Ft. Pierre is having one engine built by the Baldwin Locomotive Works.

The Southern Indiana has ordered two switching engines from the Baldwin Locomotive Works.

The Nashville, Chattanooga & St. Louis has ordered 12 engines from the Baldwin Locomotive Works.

The Missouri, Kansas & Texas has ordered five locomotives from the Baldwin Locomotive Works, in addition to the 17 ordered and reported in our last issue.

The Baltimore & Ohio has ordered 100 locomotives. Of these, the Baldwin Locomotive Works will build 20 compound consolidation and 35 compound 10-wheel; the International Power Co., 35 10-wheel; the Richmond Locomotive Works, 10 switching. The switching engines will have 19-in. x 24-in. cylinders; 50-in. diam. driving wheels; 11 ft. total wheel base; 62-in. diam. boilers, with 2¼ in. x 13 ft. 10 in. tubes; 78 in. x 41 in. fire-boxes; and will weigh in working order, 126,000 lbs.

BRIDGE BUILDING.

Albuquerque, N. Mex.—The Atchison, Topeka & Santa Fe, on behalf of the city, has let a contract to the Missouri Valley Bridge & Iron Works, for a steel viaduct over the Atchison tracks, at $21,500.

Atlantic, Va.—F. W. McCullough is reported to have permission from the Local Board of Improvements to build a bridge 300 ft. long across Tarrants Creek, at a cost of about $12,000.

Barrie, Ont.—The County Council will rebuild the bridge on Wye River at Wyebridge.

Bay City, Texas.—An election will be held, April 2, to decide the issuance of $40,000 of bonds for bridging the Colorado River. Address the County Commisssioners.

Bay St. Louis, Miss.—A committee is appointed to make plans and specifications for a bridge across West Habolochitto Creek.

Boston, Mass.—William Jackson, City Engineer, wants bids, until March 6, for building the extension of the north abutment of the Malden Bridge.

Bout de L'Ile, Quebec.—Bids will soon be wanted for the large steel bridge for the Chateaguay & Northern Ry. over River des Prairies. The Dominion Parliament has voted $150,000 toward the cost. The total length will be 4,708 ft. This distance is comprised in two bridge structures across the two channels, one on the west side of 1,594 ft., that on the east of 1,114 ft., and 2,000 ft. of rails across the island in the middle. The larger bridge will have 11 spans, and the other eight. The width of the bridge for the railroad is 16 ft. There is a 10-ft. roadway on each side for carriages and foot passengers. Several small bridges will also be required. D. Murphy, of Ottawa, Ont., is President.

Buffalo, N. Y.—A temporary bridge will be built over Genesee street by order of the Grade Crossing Commission.

The Grade Crossings Commission has directed Engineer Guthrie to prepare plans and specifications for a viaduct over the Erie tracks in Van Rensselaer street and to advertise for bids.

The Aldermen have adopted a resolution providing for a bridge over the Buffalo, Rochester & Pittsburgh tracks at South Parkway, at a cost of about $19,000.

The Governor has signed the bill providing for the elimination of railroad grade crossings, on the Belt Line, in Buffalo at Kensington, Dewey, Main, Amherst, Jewett and Leroy avenues and Elk street at the Market.

Burlington, Iowa.—On Feb. 22 the House of Representatives passed a bill authorizing the Citizens' Bridge Co. to build a bridge across the Mississippi River at Burlington, Iowa. (Jan. 25, p. 67.)

Charlottetown, P. E. I.—It is the intention of the Provincial Government to build a steel bridge over the North River, to be 600 ft. in length; cost about $80,000.

Chatham, Ont.—J. C. F. Fleming, County Clerk, informs us that he is receiving bids, until March 8, for a 130-ft. approach to the bridge over River Thames.

Cleveland, Ohio.—The contract for the superstructure for the Middle Seneca street bridge over Cuyahoga River is let to G. William Doerzbach, of Sandusky, and the substructure to F. E. Gribben, of Cleveland. The bridge is of the Sherzer type, being a double rolling lift bridge of 120 ft. clear waterway, 138 ft. center to center of bearings, 210 ft. over all. Roadway 25 ft. clear, two sidewalks 7 ft. each. The total cost will be $110,000. James Ritchie, City Engineer.

Columbus, Ohio.—Bids are wanted, March 13, by the County Auditor, for the following work:

The substructure, superstructure, approaches and paving of the Hibernia bridge over Big Walnut Creek on the National road.

The substructure, superstructure and paving of the Reynoldsburg bridge over Black Lick Creek.

The substructure, superstructure and approaches of the Milburn bridge over Black Lick Creek.

The substructure and superstructure of the Mason Run bridge on the National road.

The arch culvert south of Hibernia. (See this column, Feb. 8, p. 101.)

The Board of Public Works is considering rebuilding the Carthage viaduct.

Dalton, N. H.—The Legislature is reported to have passed a bill for a free bridge over the Connecticut River at Dalton.

Dayton, Ohio.—The People's Railway Co. has offered to pay $25,000 toward building a new bridge at Main street, which would enable it to make contemplated extensions.

Duluth, Minn.—Bids are wanted, March 25, for building, and operating for 20 years, the ferry bridge across the ship canal from Lake avenue, Duluth, which was described and illustrated in the *Railroad Gazette*, Jan. 26, 1900. T. W. Hugo, Chairman Special Ferry Bridge Commission.

Fort Coulonge, Que.—A deputation has asked the Dominion Government for an appropriation of $40,000 to aid in building an interprovincial bridge between this place and Gore Point.

Gonzales, Tex.—Bids are wanted, March 4, for three steel bridges, as follows: One across Peach Creek at the Braches crossing, A. W. Harman, Comr., Gonzales; one across Foster Branch, near Belmont, J. C. West, Comr., Leesville, one across Copperas Creek, near Waelder, N. F. Miller, Comr., Waelder. Address commissioners as above. W. W. Glass, County Judge.

Hamilton, Ont.—The Board of Works has ordered the City Solicitor to take action to compel the Grand Trunk to widen the bridge over the tracks at the high level road.

Judson, Minn.—A bill has been introduced in the Legislature appropriating $12,000 for a bridge across the Minnesota River near the Northwestern depot in Judson.

Lebanon, Ind.—The County Commissioners have adopted specifications for the bridge over Sugar Creek, in Harrison Township, on what is known as Lost Road, and bids are wanted on stone and steel structures, 120 ft. long, March 14.

Lewisburg, Pa.—A bill has passed the Senate providing for a free bridge at the foot of Market street, Lewisburg.

Lockland, Ohio.—The Hamilton County Commissioners are considering building a bridge over Millcreek, connecting Davis street, Lockland, with Clark street, Reading.

Lowell, Mass.—The City Engineer will make plans for a new bridge to replace the Pawtucket bridge at a cost of about $60,000.

Lurich, Va.—A company has been formed by citizens of Giles County, Virginia, and Monroe County, West Virginia, to build a bridge across New River at Lurich.

Madison, Neb.—Bids are wanted, March 18, for bridge work in the county during 1901. Philip Bauch, Clerk.

McCord, Ga.—Bids are wanted, according to report, for a steel bridge 150 ft. long. Address McDonald & Parks, McCord, Ga.

Milwaukee, Wis.—The Milwaukee, Burlington & Lake Geneva (electric) Ry., recently incorporated, has petitioned the city for permission to enter the city on elevated tracks and to build a bridge at the foot of Washington street. I. N. Bick, of Toledo, Ohio, is interested.

Mittineague, Mass.—Bids will probably be wanted, before May 1, by the Hampden County Commissioners for a two-span steel-deck bridge over Westfield River. Collins & Norton, of Springfield, are the Engineers.

Montgomery, Ala.—The U. S. Senate has passed a bill authorizing a street railroad bridge across the Alabama River, at Montgomery.

Montreal, Que.—The Grand Trunk Ry. will build subways at the Point St. Charles, according to report.

New York, N. Y.—Bids are wanted, March 11, for building the Brooklyn tower foundations for East River Bridge No. 3, as mentioned on another page.

The Secretary of War has approved the plans for the Blackwell's Island bridge known as East River Bridge No. 4. It will have two cantilever spans and the total length will be 2,710 ft. It will accommodate two elevated railroads, two double roads for trolley lines, paths for bicycle riders, footpaths, two roadways for heavy teams and also roadways for lighter vehicles. The estimated cost of the structure is $5,740,000.

The Long Island Railroad proposes to abolish the grade crossing at Avenue U, in the Borough of Brooklyn. The work will cost $27,000. The Railroad Commissioners gave a hearing on Feb. 21.

The Department of Water Supply, 21 Park Row, Manhattan, wants bids, until March 7, for some iron work and bridges.

Omaha, Neb.—Arrangements are reported about completed for an 860-ft. viaduct across Thirty-sixth street, from West A street to a point half way between C and D streets for the Fremont, Elkhorn & Missouri Valley. The main structure will be 450 ft. in length with 410 ft. of approaches, and will cost about $75,000.

Pacific Junction, Iowa.—The contract for the second track between Creston and Pacific Junction, just let by the Chicago, Burlington & Quincy, does not include the bridge work which will be let later.

Pittsburgh, Pa.—The present Lincoln avenue bridge, located in the northeastern part of the city and carrying Lincoln avenue across Beechwood Boulevard, a wooden deck Howe truss, on iron piers and stone abutments, will be replaced by a new structure with two masonry abutments and a steel arch of 310 ft. span. The arch will be of the spandrel braced type, with three hinges. The width of the bridge will be 50 ft., center to center of railing, of which 30 ft. will be roadway. The total length of bridge will be 472 ft. The estimated cost is $165,000. John Brunner, Superintendent, Bureau of Engineering, Department of Public Works.

Portsmouth, N. H.—W. J. Lawler, of Charlestown, Mass., got the contract for the 292-ft. railroad trestle bridge for the Portsmouth Navy Yard.

Princeton, Ind.—Bids are wanted, March 6, for 18 county bridges. J. W. Phillips, Chairman Board of County Commissioners.

St. Louis, Mo.—A bill has passed the Senate and House authorizing a bridge across the Mississippi River from St. Louis to some suitable point in St. Clair County, Ill., which may be used by street and other railroads. The bill is an amendment to the act approved March 3, 1897.

Scranton, Miss.—Reports state that a contract will be let, on March 4, for a steel drawbridge over Fort Bayou. F. H. Lewis, Clerk.

Scranton, Pa.—The County Commissioners want bids on March 6, at the Court House, for some stone and iron bridges. Plans and specifications may be seen at the office of Stevenson & Knight, Court House, Scranton.

Springfield, Mass.—The Council has passed an order to petition the Legislature for additional legislation to compel the raising of the Consolidated railroad's tracks, to allow an overhead bridge on the approach to the new bridge over the Connecticut.

A commission to locate and apportion the cost of a bridge across the Connecticut at Springfield has been appointed by the Superior Court. The bridge will replace a wooden structure and will cost from $250,000 to $350,000.

Tacoma, Wash.—The City Council is considering building a bridge over Puyallup River at the foot of St. Paul avenue.

West Chester, Pa.—According to report the Supervisors of Birmingham township are making arrangements for building a bridge over Strode's Run, below Sager's Mill.

Winnfield, La.—The Arkansas Southern Railroad, C. C. Henderson, General Manager, Ruston, La., will build a bridge across Red River.

Wysox, Pa.—We are told that the viewers have reported favorably on the proposed bridge over the Susquehanna River at Wysox, Bradford County.

Other Structures.

Franklin, Pa.—The Grant Tool Company, of Cleveland, which was disabled by a fire some time ago, is building a large plant in Franklin, Pa., which will be ready in June, when the Cleveland works will be abandoned. President J. J. Grant is reported as saying that the new works will consist of six steel buildings and the main building will be 250 ft. long by 100 ft. wide. This building will be equipped with an electric traveling crane of 25 tons capacity. The powerhouse, which is now under roof, will be equipped with a 300-h.p. Brown engine and a large battery of "Erie" boilers. In addition it will contain an electric light plant. Contracts are being placed for machinery and tools. The Osborn Co. are the Engineers.

Omaha, Neb.—The Union Pacific is considering spending about $1,000,000 in enlarging its car shops, but we are told that nothing is decided.

Pittsburgh, Pa.—McKenna Bros., Ltd., will build a powerhouse at First avenue and Ross street, to be 100 x 84 ft. and eight stories high. The structure will be of brick and steel and cost about $100,000. J. T. Steen is the Architect.

Reading, Pa.—Lewis Haven's Sons, Philadelphia, want estimates for the new blacksmith and forge shops, storehouse and boiler-house for the Philadelphia & Reading, at their new locomotive repair shops in Reading. The smith and forge shops will be one-story high, 568 x 63½ ft., having attached a furnace lean-to, 190 x 21 ft. The storehouse will be two stories high, 103 x 67 ft., and the boiler shop one story, 405 x 119 ft. They will be constructed of brick, stone and steel, from plans by Architect Wilson Bros. & Co.

Sault Ste. Marie, Ont.—Mr. Francis H. Clergue announces that his company will erect at once charcoal blast furnaces to make 600 tons of pig iron daily. The company is building rail mills and Bessemer plant, each of 600 tons daily capacity, and expects, in the spring, to have eight seagoing steel ships ready for export trade.

Summit, N. J.—The Lackawanna proposes to build a freight depot on ground recently bought.

Swissvale, Pa.—Fire, on Feb. 18, destroyed the pattern shop of the Union Switch & Signal Co.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xi.)

The New England Street Railway Club.

This Club, which was organized a few months ago, is now represented before the public by a monthly publication, the New England Street Railway Club *Bulletin*, which is published monthly at $1 a year, single copies 20 cents. It may be had from Mr. Robert H. Derrah, 164 Federal street, Boston, Mass. The first issue, that for February, has just appeared and contains a short history of the club, with a list of its officers, and a report of the annual meeting and dinner held last January.

Central Railway Club.

At the annual meeting on Jan. 11, the Central Railway Club elected officers for 1901 as follows: President, George W. West, S. M. P., N. Y., O. & W. R. R., Middletown, N. Y.; Vice-President, J. R. Petrie, Joint Inspector, Buffalo, N. Y.; Secretary-Treasurer, Harry D. Vought, 114 Fifth avenue, New York, 384 Ellicott Square, Buffalo, N. Y.

Executive Committee.—George W. West, J. R. Petrie, H. F. Ball, M. E., L. S. & M. S. R. R., Cleveland, Ohio; E. A. Miller, M. M., N. Y. C. & St. L. R. R., Conneaut, Ohio; James Macbeth, M. C. B., N. Y. C. & H. R. R. R., Buffalo, N. Y.; H. C. McCarty, Williamsport, Pa.

New York Railroad Club.

"Japan and Its Transportation Facilities, With Some Personal Experiences in the Land of the Rising Sun" was the subject of an address by Mr. Willard C. Tyler, at the meeting of the New York Railroad Club. Mr. Tyler used an official map of Japan, showing the railroads. The address was apparently enjoyed as much by Mr. Uchida, Japanese Consul to the United States, as by the others present. There was no discussion of the subject by members, but Col. Joseph Crawford followed with some remarks on his experience in Japan and on our industrial relations with that country. Col. Crawford is Engineer of Branch Lines of the Pennsylvania Railroad, and is also Consulting Engineer and Inspector for the Imperial Railroads of Japan. He was in Japan in 1878, engaged on government railroad work, and took an active part in the formative stage of the Imperial railroads. His report, made about that time, eventually fixed the Japanese track gage standard at 3 ft. 6 in. Mr. Uchida made a short address on the industrial relations of Japan to the world, which was received with evident appreciation.

Twenty-nine new members were elected, and the names of 41 applicants for membership were received.

The subject for the next meeting will be "The Latest Development of Compressed Air for Railroad Shops and Terminals."

Car Foremen's Association, Chicago.

The regular meeting of the Car Foremen's Association of Chicago was held in Room 209, Masonic Temple, Wednesday evening, Feb. 13, about 80 members being present. Thirty-seven new members were taken in, which brings the membership past the 400 mark. The following question was discussed at length: "Is a joint evidence card covering two draft timbers and one deadwood, signed by a switching road and a railroad, proper authority for rendering bill by another switching road who makes repairs some time later; at which time nu-

merous other repairs are made indicating rough usage, the car having been delivered back and forth three times in the interim?" It was at last decided that the card as procured was proper authority for a bill. The subject, "Is the use of the cotter pin in the knuckle pin necessary or desirable," made an interesting discussion, and it was decided that this cotter pin was necessary. This decision assisted in deciding the question following: "If a foreign car is received with a knuckle pin so short that a cotter pin cannot be applied, should a longer knuckle pin be applied. If so, what authority is necessary for bill?" It was decided that proper repairs should be made and bill rendered against the owners, and a joint evidence card procured and sent to the owners for their protection. Mr. Shannon's paper, on loose draft rigging and neglected bodies of cars, was not read owing to the lateness of the hour but was ordered printed in the proceedings.

The Engineers' Club of Philadelphia.

A regular meeting of the club will be held on Saturday, March 2, 1901, at 8 o'clock, p. m., the paper being "Some Notes in China by an American Engineer" (illustrated), by F. Lynwood Garrison.

A stated meeting was held Feb. 16. Mr. Benjamin Franklin presented the first paper of the evening upon "Variations and Uses of the Standards of Measurements Employed in Field Engineering." After emphasizing the importance of accuracy in measurements, he considered the inaccuracies due to differences in standard and to instrumental methods. What is known as Philadelphia Standard is an excess of .25 of a ft. for each 100 ft. United States measure. In Boston the variation ranges from .104 to .02 per 100 ft., and in New York from .1 to .017 per 100 ft. These differences often cause confusion, especially where city engineers are working in conjunction with railroad engineers or others who use United States standard only. The methods of making measurements by the rod, the chain, the steel tape and the stadia wires were then considered, and their advantages and limitations were pointed out.

The second paper of the evening was presented by Mr. A. V. Hoyt upon "Criticisms on the Art of Land Surveying, as Followed by Civil and Mining Engineers." Mr. Hoyt referred to an article entitled "A Case of Jurisprudence in Land Surveying," published in the *Proceedings* of July, 1898, stating that it contains conditions which often confront a good land surveyor, and which he thought civil and mining engineers are but rarely capable of solving correctly. The methods of finding the corners and relocating the old boundaries of a given property were considered at length, and the author contended that a land surveyor, with his Jacob's staff and compass, was better equipped for this work, and for locating the main features of topography, than was the scientific engineer with his more refined methods. The general subjects of land measurement and of the relative advantages of theory and practice were discussed by Messrs. J. O. Clarke, Frits Bloch, Walter L. Webb, Walter Brinton, J. C. Trautwine, Jr., Silas G. Comfort, and others.

PERSONAL.

(For other personal mention see Elections and Appointments.)

—The University of Pennsylvania on Feb. 22 conferred the degree of Doctor of Science on Rear Admiral George W. Melville, Engineer-in-Chief, United States Navy.

—Mr. John Hislop, Assistant Chief Engineer of the White Pass & Yukon Railroad, was killed at Eggleston Station, near Chicago, on the Chicago, Rock Island & Pacific, on the morning of Feb. 22. He attempted to board a train starting from the station and slipped and fell under the wheels. He had come East for his wedding, which took place only three weeks before his death.

—Mr. F. B. De Garmo, the new Superintendent of the Valley Division of the St. Louis, Iron Mountain & Southern line of the Missouri Pacific at Mer Rouge, La., was born in 1859 at Shelbyville, Ky. After the war his parents moved to Warrensburg, Mo. He attended the State Normal School there, and in 1875 entered railroad service as a messenger boy. Since that time he has worked continuously for the Gould System, filling different positions as night and day operator, Train Despatcher, Chief Train Despatcher and Trainmaster.

—Mr. Charles Elliott Perkins, who for the past 20 years has been President of the Chicago, Burlington & Quincy, and who has just resigned from that position, was born Nov. 24, 1840, at Cincinnati, Ohio. He entered the service of the Burlington & Missouri River in 1859 as Cashier, and has since been continuously with the company, serving as Assistant Treasurer and Secretary from 1862 to 1865, as General Superintendent from 1865 to 1873, and as Vice-President of the Burlington & Missouri River Railroad in Nebraska from 1873 to 1880. Mr. Perkins became Vice-President and General Manager of the Chicago, Burlington & Quincy in 1876 and President in 1881.

—Capt. William Crozier, of the Ordnance Department, U. S. A., is to succeed the late General Michie as Professor of Natural and Experimental Philosophy at the Military Academy, West Point. Capt. Crozier was appointed to the Academy from Kansas in 1872, was Assistant Professor from 1879 to 1884, and was on duty in the office of the Chief of Ordnance from 1887 to 1892. He was a member of the Peace Commission at The Hague. He has served in the Philippines and more recently with the Pekin relief expedition, and was recommended for brevet as Major for gallantry in action. He has been a distinguished member of his highly scientific corps and is known as an inventor and experimenter. His appointment to the professorship gives him the rank of Colonel.

—Mr. F. W. Chaffee has been appointed General Inspector for the Car Department of the New York Central & Hudson River. He was born in Springfield, Mass., Dec. 17, 1850, and was first employed in the Connecticut River shops at Springfield. After serving there for a year and a half, and with the Wason Car Manufacturing Co. of the same city for two years more, he entered the service of the Boston & Albany, and continued with that company for eight years. Then for three years he was with the Baltimore & Ohio at Baltimore. He entered the service of the New York Central as General Foreman, and held that position for 10 years. In February, 1895, he was appointed Master Car Builder, the position he held prior to his recent appointment.

—Mr. C. H. Putnam, as recently noted, has been appointed Superintendent of Shops of the Great Northern, with headquarters at Spokane, Wash. Mr. Putnam's railroad work began with the Great Northern April 1, 1899, in the Motive Power Department as draughtsman of the St. Paul shops. Four months later he was made Superintendent of the St. Cloud shops and then Superintendent of the Great Falls, Mont., shops of the Montana Central, where he remained seven months prior to his change to East Spokane, which practically constitutes Mr. Putnam's railroad experience. His professional preparation was made in the Massachusetts Institute of Technology at Boston, after which he was several years in the works of the Putnam Machine Co., builders of railroad and machine tools at Fitchburg, Mass.

—Mr. George B. Harris, who has just become President of the Chicago, Burlington & Quincy, succeeding Mr. Perkins, has held various offices on this road for over 20 years, and has for a number of years past relieved Mr. Perkins of some of the duties of the Presidency. Mr. Harris was born in Brookline, Mass., in 1848. In 1878 he was Purchasing Agent for the Burlington & Missouri River; the following year he became Superintendent of the Atchison & Nebraska, then Assistant General Freight Agent of the Burlington & Missouri. In 1882 he was appointed Purchasing Agent of the Chicago, Burlington & Quincy, the next year becoming assistant to the General Manager of the Atchison, Topeka & Santa Fe. In 1884 Mr. Harris became General Manager of the Chicago, Burlington & Northern, and in October, 1885, assistant to the President; the following month General Manager and Vice-President of the Chicago, Burlington & Northern. He became Second Vice-President of the Chicago, Burlington & Quincy in 1890.

—Mr. R. E. Wells becomes General Manager of the proposed San Pedro, Los Angeles & Salt Lake R. R., which is projected from Salt Lake southwest to Los Angeles. Mr. Wells was born Sept. 24, 1866. After receiving a common school education in western Ontario, Canada, he entered railroad service in 1883 as office boy to the Auditor of the Kansas City, St. Joseph & Council Bluffs at St. Joseph, Mo. He continued with that company for two years in various clerical capacities, and for eight months as Secretary to the General Manager. Then for a year he was Secretary to the First Vice-President of the Chicago, Burlington & Quincy, and for three years Secretary to A. A. Robinson, Second Vice-President and Chief Engineer of the Atchison, Topeka & Santa Fe. Later he became office assistant to Mr. Robinson, and went with him to the Mexican Central in 1893, as assistant to the General Manager under Mr. Robinson's Presidency of that road. He remained at the city of Mexico for a year and a half, and then, after several months devoted to private business, became Assistant General Manager of the Santa Fe, Prescott & Phoenix at Prescott, Ariz., in which office he has continued for the past six years.

—The Atchison, Topeka & Santa Fe, as recently noted, has abolished the position of Superintendent of Car Service and created that of Superintendent of Transportation, with A. W. Towsley in charge at Topeka, Kan. Mr. Towsley was born at Whitewater, Wis., Sept. 15, 1863. His railroad service was begun in 1879 as telegraph operator and agent for the Chicago, Milwaukee & St. Paul. He continued with that company until November, 1894, with the exception of two years from 1881 to 1883, when he took a preliminary course as electrical and mechanical engineer at the University of Wisconsin. He was Train Despatcher at Milwaukee and at Chicago until 1891; Chief Train Despatcher at Dubuque, Iowa, until August, 1892; Chief Train Despatcher of the Chicago & Evanston and the Chicago & Council Bluffs divisions at Chicago until 1894, when he left that company to become Chief Train Despatcher and Superintendent of Telegraph of the Chicago & Eastern Illinois at Danville, Ill. From September, 1895, he was Chief Train Despatcher on the Fergus Division of the Great Northern, and continued with that company until October, 1897, when he became Chief Train Despatcher of the Bradford Division of the Norfolk & Western. He was advanced in that company to Car Service Agent in September, 1898, and had the duties of Chief Clerk to the Vice-President and General Manager added in May, 1899. In September of the same year he joined his present company, the Atchison, as Chief Clerk to the Third Vice-President, from which position he was advanced on Feb. 1.

ELECTIONS AND APPOINTMENTS.

Canadian Pacific.—W. Downie has been appointed Superintendent of the Kootenay section, succeeding J. W. Troup. H. E. Beasley succeeds Mr. Downie as Superintendent at Vancouver, B. C. R. Peard has been appointed Assistant Superintendent of the Western Division.

Chicago & Northwestern.—E. E. Osborn has been elected Vice-President and Secretary, succeeding M. L. Sykes, resigned, effective June 1.

Chicago, Burlington & Quincy.—George B. Harris, heretofore Second Vice-President, has been elected President, succeeding C. E. Perkins, resigned.

Cleveland, Cincinnati, Chicago & St. Louis.—C. S. Millard, Engineer Maintenance of Way of the Peoria & Eastern, at Indianapolis, Ind., has resigned to accept a position with the Delaware, Lackawanna & Western, title not yet decided upon. M. A. Naville succeeds Mr. Millard at Indianapolis, Ind.

Darien & Western.—Donald Mackay has been elected Vice-President.

Delaware, Lackawanna & Western.—Fred Warner, Division Engineer, will have charge of Scranton Division between Portland and Binghamton, and the Bloomsburg, Syracuse and Utica Divisions, with headquarters at Scranton, Pa. The jurisdiction of W. B. Hixson, Superintendent of Bridges and Buildings, covers the same territory. Geo. W. Wasley has been appointed Division Engineer of the Buffalo Division and Branches, with headquarters at Elmira, N. Y. D. L. Stewart has been appointed Superintendent of Bridges and Buildings of the Buffalo Division, at Bath, N. Y., and Herman Denberger Superintendent of Bridges on the Morris and Essex Division and Branches; the Scranton Division from Hampton Junction to Portland, and the Bangor & Portland Railway, effective March 1. The officers of the Bridge and Building Department will report to L. Bush, Principal Assistant Engineer. C. J. Phillips has been appointed Superintendent of the Buffalo Division, with headquarters at Buffalo, N. Y., succeeding Robert Dudgeon, resigned. H. H. Shepard has been appointed Superintendent of the Bangor & Portland Division, at Bangor, Pa., succeeding Mr. Phillips. Effective March 1.

Duluth, South Shore & Atlantic.—D. C. Mulvihill having resigned, Henry Bitters has been appointed Master Car Builder, effective Feb. 11.

El Paso & Northeastern.—H. W. Ridgway, heretofore Division Master Mechanic of the Mexican Central, has been appointed Superintendent of Machinery of the E. P. & N., with headquarters at Alamogordo, N. Mex.

Erie.—C. H. Bickell has been appointed Assistant Purchasing Agent, with headquarters at New York, succeeding J. W. Platten, assigned to other duties.

Fort Worth & Denver City.—W. R. Scott, heretofore Division Superintendent of the Gulf, Colorado & Santa Fe, has been appointed General Superintendent of the Ft. W. & D. C.

Greenwich & Johnsonville.—J. H. McDaniels has been appointed General Superintendent, succeeding James H. Thompson, deceased, effective Feb. 21.

Jonesboro, Lake City & Eastern.—S. K. Lenoir has been appointed Auditor, succeeding T. D. Hinchcliffe, resigned.

Lehigh Valley.—At a meeting, held Feb. 20, H. McK. Twombly was elected a Director, succeeding W. S. Bissell, resigned.

Manhattan.—Henry Gordon Stott, heretofore with the Buffalo General Electric Company, has been appointed Superintendent of Motive Power of the Manhattan, with headquarters at New York City.

Maryland & Pennsylvania.—The following appointments have been made: General Manager, J. S. Norris; Auditor, J. K. Shinn; General Freight and Passenger Agent, J. R. Klinefelter, and Master Mechanic, C. F. West. Messrs. Shinn, Klinefelter and West held similar positions on the Baltimore & Lehigh. (See R. R. News column, Feb. 22, p. 136.)

New York Central & Hudson River.—E. F. Van Hoesen has been appointed Resident Engineer of the Western District, with headquarters at Buffalo, N. Y., and J. B. McIntyre Resident Engineer of the Eastern District, at Grand Central Station, New York City. The position of Engineer of Construction has been abolished.

Ozark & Cherokee Central.—The officers of this company, referred to in the Construction column, are: President, H. W. Seaman, Clinton, Iowa; Vice-President, E. E. Hughes; Secretary and Treasurer, M. A. Cooper.

St. Louis & North Arkansas.—W. S. Roberts has been appointed Assistant Manager. F. H. Dewey becomes Auditor. Both with headquarters at Eureka Springs, Ark.

St. Louis Southwestern.—H. E. Farrell, heretofore General Freight Agent of the St. Louis Southwestern of Texas, has been appointed Freight Traffic Manager of the whole system, with headquarters at St. Louis, Mo.

Salt Lake & Mercur.—T. J. Mackintosh having resigned as General Superintendent, the office is abolished, and W. S. Hall has been appointed Superintendent, with headquarters at 703 McCornick Block, Salt Lake City, Utah.

Seaboard Air Line.—Ethelbert Belknap has been appointed General Purchasing Agent, succeeding O. D. Ball, Jr., resigned.

Southern.—C. L. Petriken has been appointed Master Mechanic of the St. Louis-Louisville Lines, with headquarters at Princeton, Ind., succeeding R. M. Boldridge, resigned.

Wabash.—F. H. Paine, heretofore Assistant Division Master Mechanic, at Decatur, Ill., has been appointed Assistant Master Mechanic, with headquarters at Chicago.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ALABAMA ROADS.—James A. Campbell, W. T. Kendrick and Frank Baltzell, of Montgomery, Ala., have made application to the Board of Revenue, of Dallas County, for right of way on a proposed electric line from Montgomery west about 50 miles through Elmore, Autauga, Dallas and Montgomery counties to the city of Selma.

ATCHISON, TOPEKA & SANTA FE.—Surveys are reported in progress for a branch line from Robin, on the Conroe branch in Texas, to run northwest about 60 miles along the valley of the Trinity River to Madisonville, with a further extension, according to report, of about 90 miles to Waco.

ATKINSON & NIOBRARA.—Plans are reported under way for building a railroad under this title from Atkinson, Neb., north about 25 miles to Perry, Boyd County. The chief promoter is A. O. Perry, of Atkinson, who was interested in the Atkinson & Northern, and later in the Dakota, Nebraska & Southern, both of which companies have done some work in this section. About 22 miles is already graded, and Mr. Perry announces that the road will be completed this year. (D., N. & S., Sept. 21, 1900, p. 628.)

BATAVIA & EASTERN.—This company has been incorporated in Illinois, with a capital stock of $100,000, to build a railroad from Batavia, Kane County, through the counties of Kane and Du Page to a point between Aurora and Wheaton on the Aurora, Wheaton & Chicago. The incorporators and first Board of Directors are: L. J. Wolff, Cleveland, Ohio; W. T. Hapeman, A. T. Long, E. E. Barrett and Charles Jones, of Chicago. The principal office is Chicago. (See Geneva, Batavia & Southern below.)

BEDFORD STONE.—This company was incorporated in Indiana, Feb. 15, with a capital stock of $50,000, to build a railroad from a point on the Baltimore & Ohio Southwestern near River Vale, Lawrence County, to run southwest about eight miles to Leipsic, on the Chicago, Indianapolis & Louisville. The directors are: G. H., E. E. and Z. O. Worthington, E. A. Merritt and W. B. Whiting. The same directors incorporated the American Quarries Co., with a capital stock of $200,000.

BELLINGHAM BAY & EASTERN.—Preliminary surveys are to be completed at once, according to report, for the extension around Lake Whatcom to Wickersham, Wash., about 14 miles. (Construction Supplement, July 27, 1900.)

CALIFORNIA EASTERN.—Surveys are reported in progress for an extension from Manvel, Cal., north about 30 miles to Goode Springs, Nev.

CANADIAN ROADS.—The following companies are applying to the Dominion Parliament for an extension of time to finish their works:

The Hudson Bay & Pacific, O. E. Culbert, solicitor, Ottawa.
Atlantic & Lake Superior, J. R. Thibandeau, Montreal, President.
Irondale, Bancroft & Ottawa.
Arrowhead & Kootenay, Robertson & Robertson, Victoria, B. C., solicitors.
Vancouver, Westminster, Northern & Yukon, extension of time and of territory and lengthening line.
Columbia, Kootenay Railway & Navigation, G. O. M. Dockrill, solicitor, New Westminster.
British Columbia Southern, extension of time and permission to build branches.
Columbia & Western, extension of time to build branches and to revise its boundary powers.

CHARLESTON, SUBURBAN & SUMMERVILLE.—The City Council of Charleston, S. C., has granted a franchise to this company for a portion of its proposed line between Charleston and Summerville, 20 miles. Robert P. Evans, of Charleston, is interested.

CHARLOTTE & PRINCE EDWARD ELECTRIC RAILWAY & IMPROVEMENT.—This company was recently chartered by the Virginia Legislature to build an electric railroad between Smithville and Farmville, 28 miles. B. P. Eggleston, of Smithville, is interested.

CHATEAUGAY & NORTHERN.—Tenders are asked for the bridge across the river Des Prairies at Bout de l'Ile on this company's proposed line from Hochelaga Ward, Montreal, Que., via L'Assomption, to Joliette, 42 miles. D. Murphy, of Ottawa, is President.

CHICAGO & NORTHWESTERN.—A contract has been let to Winston Bros., Minneapolis, Minn., for removing 600,000 cu. yds. of earth and building four miles of grade at a point near the roundhouse at South Omaha. Two miles of the old track will be rebuilt. Contracts have been sublet to Lamoreaux Bros., and to W. F. Callihan, both of Omaha.

CHICAGO, BURLINGTON & QUINCY.—Contracts have been awarded at an approximate cost of $1,500,000 for grading and track laying for a second track from Creston, Iowa, to Pacific Junction. The contracts do not include bridge building, which will be let later. The contractors are: D. D. Streeter, 1,000,000 cu. yds.; Winston Bros., Minneapolis, 500,000 cu. yds.; S. S. Mallory, Chariton, Iowa, 500,000 cu. yds.; M. Elmore, Alliance, Neb., 300,000 cu. yds. With the completion of this line the Burlington will have a complete second track from Chicago to Pacific Junction. It is expected to complete the track between Creston and Red Oak, 54 miles, the present year. (Jan. 18, p. 51.)

COLUMBIA & MONTOUR ELECTRIC.—This company's electric line is to run from Catawissa, Pa., northeast through Rupert to Bloomsburg, and thence through Espy, Almedia, Afton, Centerville and Lime Ridge to Berwick. Thence across the river to Nescopeck. Later it is proposed to extend it west to Danville, 12 miles, and north to Orangeville, six miles. M. F. D. Scanlan & Co., of Bloomsburg, Pa., have the contract. Mr. Scanlan was, until recently, Division Engineer of the Atlantic City R. R., and has recently gone to Bloomsburg to give his personal attention to the work. (Jan. 25, p. 69.)

COPPER RANGE.—The company will build a branch from Painsdale Junction, Mich., to Lake Superior, 10 miles; also a belt line to Adventure mine, three miles.

EASTERN & NORTHWESTERN.—Surveys are reported in progress for this line from Benton Harbor and St. Joseph, Mich., to run east about 160 miles to Toledo, Ohio. About 10 miles is reported graded between Dowagiac and Sister Lakes. The principal office is Benton Harbor. Julius Cunitz, of Laporte, Ind., is a projector. (Dec. 28, 1900, p. 860.)

GENEVA, BATAVIA & SOUTHERN.—This company was incorporated in Illinois Feb. 22, with a capital stock of $100,000, to build a railroad from Geneva, Kane County, north through Batavia, St. Charles and other towns to Aurora. The incorporators and first Board of Directors are: L. J. Wolff, Cleveland, Ohio; W. T. Hapeman and A. T. Long, Chicago.

JARVISVILLE & TEN MILE.—This company has been incorporated, in West Virginia, with a capital stock of $100,000, to build a railroad from Jarvisville north 14 miles down Ten Mile Creek, to a point on the West Virginia Short Line near Sardis. Surveys are reported in progress. Among those interested are: O. L. McKinny and R. C. Dunnington, of Fairmont; D. O. Morgan, of Big Buffalo, and Dr. Thomas M. Hood and B. B. Stout, of Clarksburg, W. Va.

KANSAS ROADS.—The Montgomery County Commissioners have granted a charter for an electric railroad nine miles long from Independence to Cherryvale, to T. H. Stanford, I. B. Wallace and G. W. Guernsey.

KEOKUK & WESTERN.—Preparations are being made for building a spur about three miles long from a point on the main line two miles south of Des Moines, Iowa, to the site of the new army post.

MASON CITY & FORT DODGE.—A meeting of the stockholders is to be held at Fort Dodge, Iowa, to act on the proposed extension from Lehigh, Iowa, southeast about 75 miles along the Des Moines River via Boone to Des Moines.

MISSOURI PACIFIC.—The company, according to report, has made a proposition to the people of Jefferson City, Mo., for the proposed river cut-off from that city northwest about 40 miles to Boonville. The reported offer includes the establishment of a division at Jefferson City, the building of a roundhouse, blacksmith and repair shops and tracks necessary for division facilities. In return the company asks a bonus of $15,000 cash and property valued at $5,000. The road and shops are to be in operation within a year. (Feb. 22, p. 136.)

MONTREAL TERMINAL.—The road committee of the City Council having reported in favor of giving this company permission to extend its lines into the city, Managing Director Mullarky is urging the company to locate the tracks at once that work may be begun early in the spring, thus giving Montreal citizens the advantage of a second street railroad service. (Construction Supplement, July 27, 1900.)

MORNING STAR.—This company was incorporated in Arkansas, Feb. 22, with a capital stock of $2,500,000, to build a railroad from a point on the Buffalo River, near its junction with Rock Creek, to run southeast down the White River to a point opposite Mountain View, and thence via St. James, Marcella, Jamestown and Oil Trough to Newport. The incorporators are: George H. Heafford, Theodore Rockefeller and W. L. Johnson, of Chicago; George W. Chase, S. G. Wilson and Cal. Williams, of Rush, Ark.

OMAHA NORTHERN.—Contract for building this new line from Sioux City, Iowa, south about 92 miles to Omaha, Neb., has been let to E. P. Reynolds, Jr., of Wymore, Neb. Building is to be begun as soon as Congress has granted right of way through the two Indian reservations. The company's trains will enter Sioux City over the Combination Bridge and will use the passenger station of the Union Terminal Ry. Co. A. S. Churchill, of Omaha, Neb., is President. (Jan. 25, p. 70.)

ONTARIO ROADS.—A delegation from Nipissing District has waited on Premier Ross and E. J. Davis, Commissioner of Crown Lands, to present the claims for a railroad in that District from North Bay, on the C. P. R., to run north to Thornloe. Among those interested are John Armstrong and Angus McKelvey, of Thornloe, and W. B. McMurrich and Hugh Blain, of Toronto.

OZARK & CHEROKEE CENTRAL.—This company has been organized as successor to the North Arkansas & Western, which is building a line from Fayetteville, Ark., on the St. Louis & San Francisco, to run southwest about 70 miles, via Prairie Grove, Ark., and Stillwell, Ind. T., to Talequah. Building is completed for about 10 miles. The officers are given under Elections and Appointments. (North Arkansas & Western, Construction Supplement, July 27, 1900.)

PETERSBURG & CLAREMONT TERMINAL.—Surveys are completed for this proposed line from Petersburg, Va., to Claremont on the Middle James. The company will soon be in position to negotiate the building of this part of its road. The line is chartered to run west to Petersburg, with option of going to West Virginia, Kentucky or Tennessee. About 1½ miles of frontage has been acquired for terminals at Claremont, in addition to other large real estate concessions. Geo. J. Seay, a banker of Petersburg, Hon. James R. Hopper and J. H. Arrington, of Claremont, Va., are interested. (Construction Supplement, July 27, 1900.)

PITTSBURGH, JOHNSTOWN, EBENSBURG & EASTERN.—This company proposes to make extensions in Pennsylvania as follows: From Keppee to Coleman, 1½ miles; from Janesville to Frugality, 14 miles; and from Plancks to Frugality, 10 miles.

QUEBEC SUBURBAN ELECTRIC.—This company is making application to the Quebec Legislature for a charter to build an electric railroad from a point in the city of Quebec, crossing the parishes of Limoilon, Beauport and Charlesburg to Lake Saint Charles, crossing the parishes of Saint Ambrose de la Jenne Lorette, L'Ancienne Lorette, Saint Felix of Cape Rouge, Saint Foye Notre Dame of Quebec, and the city of Quebec to reach the starting point, with power also to cross the St. Lawrence River, and to build on the south shore an electric railroad in the counties of Lotbiniere and Levis, and including the town of Levis, Quebec.

SALINE RIVER.—An extension is to be built from Draughton, Ark., to New Edinburg, eight miles.

SOUTHERN UNION.—This company has been incorporated in Tennessee, with a capital stock of $10,000, to build a railroad from Buckeye, Campbell County, on the Ohio River & Charleston, to run northwest about 15 miles to Oneida, on the Cincinnati, New Orleans & Texas Pacific.

SOUTH SHORE.—H. Beauchemin, of Montreal, is applying to the Dominion Parliament for an extension of time for the completion of this line and for the ratification of its title to the Montreal & Sorel, the Great Eastern and part of the Montreal & Atlantic; also for permission to issue bonds on these lines as being part of the South Shore.

SPARTANBURG RAILWAY, GAS & ELECTRIC.—This company has been incorporated, in South Carolina, with a capital stock of $400,000, to build an electric line from Spartanburg to neighboring mill towns. F. D. McEowan is President, and P. H. Gadsden Secretary, both of Charleston. The Charleston Consolidated Railway, Gas & Electric is probably interested.

TENNESSEE CENTRAL.—Building is reported begun on a branch from Ozone, Tenn., to coal mines at Millstone, five miles.

WABASH.—Surveys are reported in progress for the proposed connecting line from Fort Wayne, Ind., to Butler.

WASHINGTON & GETTYSBURG.—The Senate has passed a joint resolution extending for two years the time in which this company is permitted to extend its line into the District of Columbia. The road is projected from Washington, D. C., north about 72 miles to Gettysburg, Pa. Gen. Geo. H. Harries, of Washington, D. C., is President. (Oct. 26, 1900, p. 712.)

WEST VIRGINIA CENTRAL & PITTSBURGH.—The company has run some lines from the Valley of Virginia west toward the Shenandoah Valley. This is being done in connection with the Coal & Iron R. R., now building from Elkins to the forks of the Greenbrier River. A line eastward to terminate in the Valley of Virginia near Harrisonburg would give the company additional territory for coal and lumber, with a connection with the Southern and the Baltimore & Ohio. (Official.)

WEST VIRGINIA ROADS.—The Imboden Coal & Coke Co. is reported surveying a railroad from the Gauley extension to the Chesapeake & Ohio, near Gauley Junction, Fayette County, to coal lands belonging to the company. It is stated that a contract has been let for a portion of the line, and that six miles will be built as soon as possible.

GENERAL RAILROAD NEWS.

ALBERTA RAILWAY & COAL.—George Edwards, Secretary, is applying to the Dominion Parliament for permission to sell the line to the Calgary & Edmonton or to the Canadian Pacific, the parent company. (Sept. 21, 1900, p. 608.)

CHATTANOOGA, ROME & SOUTHERN.—A syndicate formed by Simon Borg & Co., New York, has already nearly all the capital stock of this company, with the intention, as reported, of turning it over to some other system. The line runs from Carrollton, Ga., to Chattanooga, Tenn., 138 miles.

CHICAGO & SOUTHEASTERN.—Judge Collover, on Feb. 14, appointed Benjamin F. Simpson receiver of this property. The company will appeal the matter to the Supreme Court. (Feb. 15, p. 120.)

CHICAGO, BURLINGTON & QUINCY.—Lee, Higginson & Co., have bought $2,000,000 of 3½ per cent. refunding bonds, one-half the proceeds of which are to be used in paying off bonds due next July.

ERIE.—Justice Fitzgerald, of the Supreme Court, New York, on Feb. 18, handed down a decision denying the application of Richard Pine-Coffin for an injunction to restrain the company from carrying out its agreement to buy the Pennsylvania Coal. (Feb. 15, p. 120.)

LEHIGH VALLEY.—The interest of the Vanderbilts in this property was recognized, on Feb. 20, by the election of H. McK. Twombly, a director in the New York Central & Hudson River and other Vanderbilt lines.

MICHIGAN TRACTION.—Dick Bros. & Co., New York and Philadelphia, and the Fidelity Title & Trust Co., Pittsburgh, offer $700,000 of this company's first mortgage 5 per cent. sinking fund gold bonds at 103 and accrued interest after 10 a. m., Feb. 27. This company, which is controlled by the Railways Company General, in addition to its present lines at Kalamazoo, between Kalamazoo, Mich., and Battle Creek, proposes to build extensions toward Detroit and Chicago. (Railroad Construction, Railways Company General, Dec. 7, 1900, p. 818.)

MOBILE & OHIO.—The stockholders, at the annual meeting, at Mobile, Ala., Feb. 20, ratified the action of the Governing Board relative to the sale of the property to the Southern. Official announcement is made that the plan of interchange of securities is operative.

The Mississippi Railroad Commission, on Feb. 19, adopted resolutions declaring it their opinion that no good purpose is subserved by instituting proceedings to prevent the consolidation of the Southern Ry. and the Mobile & Ohio, and the case was dismissed. (Feb. 22, p. 136.)

MONT ALTO.—This property is advertised to be sold at auction on April 27, at Chambersburg, Franklin County, Pa., under foreclosure of the mortgage of 1871. The mortgage is for $125,000 6 per cent. bonds which have been in default since December, 1877. The line extends from Mont Alto Junction to Waynesburg, Pa., 17.9 miles, and is operated under lease by the Cumberland Valley line of the Pennsylvania.

OHIO SOUTHERN.—The first mortgage bondholders committee, of which Wm. A. Read is chairman, notifies holders of certificates of the Central Trust Co., issued on deposit of the first mortgage 6s under the agreement of June 21, 1896, that an offer has been made to buy the property acquired by the committee which the committee has accepted subject to the approval of the certificate holders. A meeting is called for March 11 at 2 p. m., at the Audit Company, New York, to consider the proposition. The offer is understood to come from F. J. Lisman & Co., in behalf of men interested in bituminous coal properties in the Ohio mining districts.

PENNSYLVANIA.—The new stock to be authorized by the stockholders at the annual meeting, March 12, under the bill recently passed by the Legislature, it is understood, will be approximately for the total amount, $100,000,000. Of this $50,000,000 will be issued immediately and present stockholders will be permitted to subscribe at par for an amount equal to about 30 per cent. of their holdings.

At the annual meeting action will be taken as to the classification of directors under the act of assembly of Feb. 9, which provides that all railroad and transportation companies may hereafter classify their directors by electing a certain proportion to serve for terms of one, two, three or four years. (Jan. 25, p. 70.)

Holders of the United New Jersey Railroad & Canal Co. 6 per cent. coupon bonds are notified that the entire $5,669,000 will be paid at maturity, March 1, principal and interest, at the office of the Pennsylvania R. R.

READING.—J. P. Morgan & Co. are offering $23,000,000 of New Jersey Central collateral 4 per cent. gold bonds at 94 and interest. (Feb. 22, p. 136.)

SALT LAKE & LOS ANGELES.—This line, which extends from Salt Lake City, Utah, to Saltair, 15 miles, is reported sold to Thomas Kearns, recently elected United States Senator from that State.

SEABOARD AIR LINE.—On Feb. 19, in pursuance of an arbitration before Daniel S. Lamont, Thomas F. Ryan transferred his entire holdings in this company and its constituent companies to President Williams. Mr. Ryan has been opposing the completion of the consolidation for the past three years. He owned 2,858 shares of the Seaboard & Roanoke, the parent system, and less than 100 shares each of Raleigh & Gaston and Raleigh & Augusta. President Williams is reported as announcing that the system will continue to be operated independently and makes the following statement with reference to Mr. Ryan's transfer:

The report that we have bought Mr. Ryan's holdings of stocks in the Seaboard Air Line system upon which he has based the suits which he has been conducting for several years past is correct. The certificates for these stocks were delivered to me to-day and are now in my possession. The settlement was on a cash basis and no new securities were issued in exchange for the securities delivered to us by Mr. Ryan. All suits which have been pending will be immediately withdrawn, and with the consummation of this transaction all opposition of every sort whatsoever to the plans of the Seaboard Air Line is removed, and the last cloud disappears from the horizon. (Oct. 5, 1900, p. 662.)

SIERRA VALLEYS.—At foreclosure sale at Oakland, Cal., Feb. 14, this property was bought by the Southern Pacific. The sale was to meet a judgment by the Southern Pacific for $18,965.83. (Dec. 21, 1900, p. 852.)

SOUTHERN.—The Central Trust Co., New York, will receive bids, up to Feb. 28, for as many Georgia Pacific equipment 5 per cent. bonds of July 17, 1889, as will consume not more than $56,606.88, at a price not to exceed par and accrued interest. (June 29, 1900, p. 458.)

UNION PACIFIC.—At a special meeting of the stockholders called for March 23, at Salt Lake City, Utah, the directors will submit a proposition to issue $100,000,000 of new common stock in connection with the proposed issue of $100,000,000 of 4 per cent. bonds. (Feb. 15, p. 120.)

VELASCO TERMINAL.—A decree was entered in the District Court at Angleton, Tex., Feb. 17, for the sale of this property on the first Thursday in May, the Court reserving the right to reject all bids. Several attempts at sale of the property have been made. (Sept. 14, 1900, p. 614.)

VICKSBURG, SHREVEPORT & PACIFIC.—This property is advertised to be sold under foreclosure, March 30, subject to the prior lien mortgage of $1,323,000. The upset price is $1,000,000. (Nov. 9, 1900, p. 748.)